UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-Q

(Mark One)

☒ **QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the quarterly period ended June 30, 2022

or

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from to

Commission file number 000-30941

AXCELIS TECHNOLOGIES, INC.

(Exact name of registrant as specified in its charter)

Delaware	**34-1818596**
(State or other jurisdiction of incorporation or organization)	(IRS Employer Identification No.)

108 Cherry Hill Drive
Beverly, Massachusetts 01915
(Address of principal executive offices, including zip code)

(978) 787-4000
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading symbol	Name of each exchange on which registered
Common Stock, $0.001 par value	ACLS	Nasdaq Global Select Market

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐.

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☒	Accelerated filer ☐
Non-accelerated filer ☐	Smaller reporting company ☐
	Emerging growth company ☐

If an emerging growth company, indicate by check mark if registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act) Yes ☐ No ☒

As of August 2, 2022, there were 33,033,791 shares of the registrant's common stock outstanding.

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PART 1—FINANCIAL INFORMATION

Item 1. Financial Statements.

Axcelis Technologies, Inc.
Consolidated Statements of Operations
(In thousands, except per share amounts)
(Unaudited)

	Three months ended June 30,		Six months ended June 30,	
	2022	2021	2022	2021
Revenue:				
Product	$ 213,926	$ 140,156	$ 410,458	$ 266,765
Services	7,251	7,118	14,314	13,285
Total revenue	221,177	147,274	424,772	280,050
Cost of revenue:				
Product	115,754	76,688	223,395	147,022
Services	6,242	6,572	12,429	12,579
Total cost of revenue	121,996	83,260	235,824	159,601
Gross profit	99,181	64,014	188,948	120,449
Operating expenses:				
Research and development	18,731	16,623	35,704	32,308
Sales and marketing	12,703	12,177	23,994	22,564
General and administrative	13,602	11,217	26,180	21,230
Total operating expenses	45,036	40,017	85,878	76,102
Income from operations	54,145	23,997	103,070	44,347
Other (expense) income:				
Interest income	352	40	447	73
Interest expense	(1,250)	(1,274)	(2,768)	(2,303)
Other, net	(5,051)	(15)	(6,669)	(1,168)
Total other expense	(5,949)	(1,249)	(8,990)	(3,398)
Income before income taxes	48,196	22,748	94,080	40,949
Income tax provision	4,007	3,842	8,276	5,563
Net income	$ 44,189	$ 18,906	$ 85,804	$ 35,386
Net income per share:				
Basic	$ 1.34	$ 0.56	$ 2.59	$ 1.05
Diluted	$ 1.32	$ 0.55	$ 2.54	$ 1.03
Shares used in computing net income per share:				
Basic weighted average common shares	33,096	33,677	33,170	33,696
Diluted weighted average common shares	33,562	34,311	33,770	34,473

See accompanying Notes to these Consolidated Financial Statements (Unaudited)

Axcelis Technologies, Inc.
Consolidated Statements of Comprehensive Income
(In thousands)
(Unaudited)

	Three months ended June 30,		Six months ended June 30,	
	2022	**2021**	**2022**	**2021**
Net income	$ 44,189	$ 18,906	$ 85,804	$ 35,386
Other comprehensive (loss) income:				
Foreign currency translation adjustments	(2,685)	552	(3,871)	(820)
Amortization of actuarial gain and other adjustments from pension plan, net of tax	8	34	17	54
Total other comprehensive (loss) income	(2,677)	586	(3,854)	(766)
Comprehensive income	$ 41,512	$ 19,492	$ 81,950	$ 34,620

See accompanying Notes to these Consolidated Financial Statements (Unaudited)

Axcelis Technologies, Inc.
Consolidated Balance Sheets
(In thousands, except per share amounts)
(Unaudited)

	June 30, 2022	December 31, 2021
ASSETS		
Current assets:		
Cash and cash equivalents	$ 287,167	$ 294,923
Accounts receivable, net	146,120	104,410
Inventories, net	213,063	194,984
Prepaid expenses and other current assets	33,378	24,929
Total current assets	679,728	619,246
Property, plant and equipment, net	35,572	34,972
Operating lease assets	10,879	9,242
Finance lease assets, net	18,590	19,238
Long-term restricted cash	753	757
Deferred income taxes	33,715	35,454
Other assets	32,499	34,331
Total assets	$ 811,736	$ 753,240
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 49,410	$ 38,025
Accrued compensation	17,150	30,732
Warranty	8,348	6,424
Income taxes	321	887
Deferred revenue	62,685	60,454
Current portion of finance lease obligation	1,101	979
Other current liabilities	13,955	12,639
Total current liabilities	152,970	150,140
Long-term finance lease obligation	45,822	46,415
Long-term deferred revenue	8,864	7,982
Other long-term liabilities	17,153	9,744
Total liabilities	224,809	214,281
Commitments and contingencies (Note 16)		
Stockholders' equity:		
Common stock, $0.001 par value, 75,000 shares authorized; 33,094 shares issued and outstanding at June 30, 2022; 33,240 shares issued and outstanding at December 31, 2021	33	33
Additional paid-in capital	549,401	559,883
Retained earnings (accumulated deficit)	39,582	(22,722)
Accumulated other comprehensive (loss) income	(2,089)	1,765
Total stockholders' equity	586,927	538,959
Total liabilities and stockholders' equity	$ 811,736	$ 753,240

See accompanying Notes to these Consolidated Financial Statements (Unaudited)

Axcelis Technologies, Inc.
Consolidated Statements of Stockholders' Equity
(In thousands)
(Unaudited)

	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Income (Loss)	Total Stockholders' Equity
Balance at December 31, 2020	33,633	$ 34	$ 570,102	$ (91,969)	$ 3,435	$ 481,602
Net income	—	—	—	16,480	—	16,480
Foreign currency translation adjustments	—	—	—	—	(1,372)	(1,372)
Change in pension obligation	—	—	—	—	20	20
Exercise of stock options	268	—	2,512	—	—	2,512
Issuance of common shares on restricted stock units, net of shares withheld	81	—	(2,354)	—	—	(2,354)
Stock-based compensation expense	—	—	2,407	—	—	2,407
Repurchase of common stock	(303)	—	(5,468)	(6,167)	—	(11,635)
Balance at March 31, 2021	33,679	$ 34	$ 567,199	$ (81,656)	$ 2,083	$ 487,660
Net income	—	—	—	18,906	—	18,906
Foreign currency translation adjustments	—	—	—	—	552	552
Change in pension obligation	—	—	—	—	34	34
Exercise of stock options	72	—	563	—	—	563
Issuance of shares under Employee Stock Purchase Plan	15	—	509	—	—	509
Issuance of common shares on restricted stock units, net of shares withheld	214	—	(4,141)	—	—	(4,141)
Stock-based compensation expense	—	—	3,377	—	—	3,377
Repurchase of common stock	(323)	—	(5,827)	(7,531)	—	(13,358)
Balance at June 30, 2021	33,657	$ 34	$ 561,680	$ (70,281)	$ 2,669	$ 494,102

	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	(Accumulated Deficit) Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Total Stockholders' Equity
Balance at December 31, 2021	33,240	$ 33	$ 559,883	$ (22,722)	$ 1,765	$ 538,959
Net income	—	—	—	41,614	—	41,614
Foreign currency translation adjustments	—	—	—	—	(1,186)	(1,186)
Change in pension obligation	—	—	—	—	9	9
Exercise of stock options	41	—	491	—		491
Issuance of common shares on restricted stock units, net of shares withheld	67	—	(3,315)	—	—	(3,315)
Stock-based compensation expense	—	—	2,701	—	—	2,701
Repurchase of common stock	(284)	—	(5,127)	(14,873)	—	(20,000)
Balance at March 31, 2022	33,064	$ 33	$ 554,633	$ 4,019	$ 588	$ 559,273
Net income	—	—	—	44,189	—	44,189
Foreign currency translation adjustments	—	—	—	—	(2,685)	(2,685)
Change in pension obligation	—	—	—	—	8	8
Exercise of stock options	25	—	298	—	—	298
Issuance of shares under Employee Stock Purchase Plan	15	—	711	—	—	711
Issuance of common shares on restricted stock units, net of shares withheld	205	—	(5,896)	—	—	(5,896)
Stock-based compensation expense	—	—	3,527		—	3,527
Repurchase of common stock	(215)	—	(3,872)	(8,626)	—	(12,498)
Balance at June 30, 2022	33,094	$ 33	$ 549,401	$ 39,582	$ (2,089)	$ 586,927

See accompanying Notes to these Consolidated Financial Statements (Unaudited)

Axcelis Technologies, Inc.
Consolidated Statements of Cash Flows
(In thousands)
(Unaudited)

	Six months ended June 30, 2022	Six months ended June 30, 2021
Cash flows from operating activities		
Net income	$ 85,804	$ 35,386
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	5,724	5,336
Deferred income taxes	3,934	5,107
Stock-based compensation expense	6,228	5,784
Provision for excess and obsolete inventory	2,061	1,888
Changes in operating assets and liabilities:		
Accounts receivable	(45,783)	7,091
Inventories	(27,511)	(32,418)
Prepaid expenses and other current assets	(5,304)	(3,309)
Accounts payable and other current liabilities	1,507	7,282
Deferred revenue	3,290	12,460
Income taxes	(529)	(27)
Other assets and liabilities	(199)	1,341
Net cash provided by operating activities	29,222	45,921
Cash flows from investing activities		
Expenditures for property, plant and equipment and capitalized software	(3,356)	(2,392)
Net cash used in investing activities	(3,356)	(2,392)
Cash flows from financing activities		
Net settlement on restricted stock grants	(9,211)	(6,495)
Repurchase of common stock	(32,498)	(24,993)
Proceeds from Employee Stock Purchase Plan purchases	711	508
Principal payments on finance lease obligation	(475)	(362)
Proceeds from exercise of stock options	789	3,075
Net cash used in financing activities	(40,684)	(28,267)
Effect of exchange rate changes on cash and cash equivalents	7,058	992
Net (decrease) increase in cash, cash equivalents and restricted cash	(7,760)	16,254
Cash, cash equivalents and restricted cash at beginning of period	295,680	204,232
Cash, cash equivalents and restricted cash at end of period	$ 287,920	$ 220,486

See accompanying Notes to these Consolidated Financial Statements (Unaudited)

Axcelis Technologies, Inc.
Notes to Consolidated Financial Statements (Unaudited)

Note 1. Nature of Business

Axcelis Technologies, Inc. (“Axcelis” or the “Company”) was incorporated in Delaware in 1995 and is a producer of ion implantation equipment used in the fabrication of semiconductor chips in the United States, Europe and Asia. In addition, we provide extensive worldwide aftermarket service and support, including spare parts, equipment upgrades, used equipment and maintenance services to the semiconductor industry.

The accompanying unaudited consolidated financial statements have been prepared in accordance with U.S. generally accepted accounting principles for interim financial information and with the instructions to Form 10-Q and Article 10 of Regulation S-X. Accordingly, they do not include all of the information and footnotes required by generally accepted accounting principles for complete financial statements. In the opinion of management, all adjustments which are of a normal recurring nature and considered necessary for a fair presentation of these financial statements have been included. Operating results for the interim periods presented are not necessarily indicative of the results that may be expected for other interim periods or for the year as a whole.

The balance sheet at December 31, 2021 has been derived from the audited consolidated financial statements at that date but does not include all the information and footnotes required by generally accepted accounting principles for complete financial statements. For further information, refer to the consolidated financial statements and footnotes thereto included in Axcelis Technologies, Inc.’s Annual Report on Form 10-K for the year ended December 31, 2021.

Note 2. Stock-Based Compensation

We maintain the Axcelis Technologies, Inc. 2012 Equity Incentive Plan, as amended (the “2012 Equity Plan”), an Internal Revenue Code Section 423 plan, which became effective on May 2, 2012, and permits the issuance of options, restricted stock, restricted stock units (“RSUs”) and performance awards to selected employees, directors and consultants of the Company.

The 2012 Equity Plan is more fully described in Note 13 to the consolidated financial statements in our Annual Report on Form 10-K for the year ended December 31, 2021.

We recognized stock-based compensation expense of $3.5 million and $3.4 million for the three-month periods ended June 30, 2022 and 2021, respectively. We recognized stock-based compensation expense of $6.2 million and $5.8 million for the six-month periods ended June 30, 2022 and 2021, respectively. These amounts include compensation expense related to RSUs, non-qualified stock options and stock to be issued to participants under the 2020 Employee Stock Purchase Plan (the “2020 ESPP”).

In the three-month periods ended June 30, 2022 and 2021, we issued 0.2 million and 0.3 million shares of common stock, respectively, upon stock option exercises, purchases under the 2020 ESPP and vesting of RSUs. In the three-month periods ended June 30, 2022 and 2021, we received proceeds of $1.0 million and $1.1 million, respectively, in connection with the exercise of stock options and purchases under the 2020 ESPP.

In the six-month periods ended June 30, 2022 and 2021, we issued 0.4 million and 0.7 million shares of common stock, respectively, upon stock option exercises, purchases under the 2020 ESPP and vesting of RSUs. In the six-month periods ended June 30, 2022 and 2021, we received proceeds of $1.5 million and $3.6 million, respectively, in connection with the exercise of stock options and purchases under the 2020 ESPP.

Note 3. Leases

We have operating leases for office space, warehouse space, a manufacturing plant, computer and office equipment as well as vehicles used in our business operations. We have a finance lease as a result of the 2015 sale-leaseback of our corporate headquarters in Beverly, Massachusetts. All new agreements are reviewed to determine if they contain a lease component. A lease is a contract, or part of a contract, that conveys the right to control the use of identified property, plant or equipment over a period of time in exchange for consideration. We recognize the lease obligation on a discounted basis using the explicit or implicit discount rate stated within the agreement. We recognize a corresponding right-of-use asset, which is initially determined based upon the net present value of the associated liability and is adjusted for deferred costs and possible impairment, if any. For those lease agreements that do not indicate the applicable discount rate, we use our incremental borrowing rate. We have made the following policy elections: (i) operating leases with an initial term of 12 months or less are not recorded on the consolidated balance sheet; (ii) we recognize lease expense for operating leases on a straight-line basis over the lease term; and (iii) we account for lease components and non-lease components that are fixed payments as one component. Some of our operating leases include one or more options to renew, with renewal terms that can extend the respective lease term one to five years. The exercise of lease renewal options is at our sole discretion. For lease extensions that are reasonably certain to occur, we have included these renewal periods in our calculation of the net present value of the lease obligation and related right-of-use asset. Certain leases also include options to purchase the leased property. The depreciable life of certain assets and leasehold improvements is limited by the expected lease term, unless there is a transfer of title or purchase option reasonably certain of exercise. Our lease agreements do not contain any material residual value guarantees or material restrictive covenants. The amounts of operating and finance lease right-of-use assets and related lease obligations recorded within our consolidated balance sheets are as follows:

Leases	Classification	June 30, 2022	December 31, 2021
Assets		(in thousands)	
Operating leases	Operating lease assets	$ 10,879	$ 9,242
Finance lease	Finance lease assets *	18,590	19,238
Total leased assets		$ 29,469	$ 28,480
Liabilities			
Current			
Operating	Other current liabilities	$ 4,983	$ 4,716
Finance	Current portion of finance lease obligation	1,101	979
Noncurrent			
Operating	Other long-term liabilities	5,800	4,357
Finance	Finance lease obligation	45,822	46,415
Total lease liabilities		$ 57,706	$ 56,467

*Finance lease assets are recorded net of accumulated depreciation of $49.2 million and includes $0.6 million of prepaid financing costs as of June 30, 2022. Finance lease assets are recorded net of accumulated depreciation of $48.6 million and includes $0.7 million of prepaid financing costs as of December 31, 2021.

All of our operating lease office locations support selling and servicing functions. Our Axcelis Asia Operations Center facility in South Korea brings production capability closer to our Asia-based customers. Operating lease expense and depreciation and interest expense relating to our finance lease obligation are recognized within our consolidated statement of operations for the three and six months ended June 30, 2022 and 2021 as follows:

Lease cost	Classification	Three months ended June 30, 2022	Three months ended June 30, 2021	Six months ended June 30, 2022	Six months ended June 30, 2021
Operating lease cost		(in thousands)			
Product / Services	Cost of revenue	$ 1,306	$ 644	$ 2,516	$ 1,283
Research and development	Operating expenses	76	122	132	252
Sales and marketing*	Operating expenses	368	376	787	755
General and administrative*	Operating expenses	308	201	520	461
Total operating lease cost		$ 2,058	$ 1,343	$ 3,955	$ 2,751
Finance lease cost					
Depreciation of leased assets	Cost of revenue, R&D, Sales and marketing and G&A	$ 325	$ 328	$ 648	$ 656
Interest on lease liabilities	Interest expense	1,274	1,274	2,532	2,553
Total finance lease cost		$ 1,599	$ 1,602	$ 3,180	$ 3,209
Total lease cost		$ 3,657	$ 2,945	$ 7,135	$ 5,960

* Sales and marketing and general and administrative expense also includes short-term lease and variable lease costs of approximately $0.6 million and $1.0 million for the three and six months ended June 30, 2022, respectively, and includes short-term and variable lease costs of approximately $0.4 million and $0.9 million for the three and six months ended June 30, 2021, respectively.

The lease of our corporate headquarters, shown below under finance leases, had an original lease term of 22 years, beginning in January 2015 and expiring in January 2037, with renewal options. All other locations are treated as operating leases, with lease terms ranging from one to ten years. The tables below reflect the minimum cash outflow regarding our current lease obligations as well as the weighted-average remaining lease term and weighted-average discount rates used in our calculation of our lease obligations and right-of-use assets as of June 30, 2022:

Maturity of Lease Liabilities	Finance Leases	Operating Leases	Total Leases
		(in thousands)	
2022	$ 2,995	$ 2,793	$ 5,788
2023	6,114	3,837	9,951
2024	6,252	1,709	7,961
2025	5,930	1,398	7,328
2026	6,008	1,147	7,155
Thereafter	67,715	487	68,202
Total lease payments	$ 95,014	$ 11,371	$ 106,385
Less interest portion*	(48,091)	(588)	(48,679)
Finance lease and operating lease obligations	$ 46,923	$ 10,783	$ 57,706

* Finance lease interest calculated using the implied interest rate; operating lease interest calculated using estimated corporate borrowing rate.

Lease term and discount rate	June 30, 2022
Weighted-average remaining lease term (years):	
Operating leases	3.1
Finance leases	14.6
Weighted-average discount rate:	
Operating leases	4.5%
Finance leases	10.5%

Our cash outflows from our operating leases include rent expense and other charges associated with these leases. These cash flows are included within the operating activities section of our statement of cash flows. Our cash flows from our finance lease include both an interest component and a principal component. The table below shows our cash outflows, by lease type and related section of our statement of cash flows, as well as the non-cash amount capitalized on our balance sheet in relation to our operating lease right-of-use assets for the six months ending June 30, 2022 and 2021, respectively:

Cash paid for amounts included in the measurement of lease liabilities	Six months ended June 30, 2022	Six months ended June 30, 2021
	(in thousands)	
Operating cash outflows from operating leases	$ 3,955	$ 2,751
Operating cash outflows from finance leases	2,509	2,556
Financing cash outflows from finance leases	475	362
Operating lease assets obtained in exchange for operating lease liabilities	4,714	4,192
Finance lease assets obtained in exchange for new finance lease liabilities	—	—

Note 4. Revenue

To reflect the organization of our business operations, we divide revenue into two categories: revenue from sales of new systems and revenue arising from the sale of used systems, parts and labor to customers who own systems, which we refer to as “Aftermarket.”

Revenue by categories used by management are as follows:

	Three months ended June 30,		Six months ended June 30,	
	2022	2021	2022	2021
	(in thousands)			
Systems	$ 165,350	$ 100,138	$ 317,152	$ 181,129
Aftermarket	55,827	47,136	107,620	98,921
Total Revenue	$ 221,177	$ 147,274	$ 424,772	$ 280,050

We also consider revenue by geography. Revenue is allocated to geographic markets based upon the location to which our products are shipped and in which our services are performed. Revenue in our principal geographic markets is as follows:

	Three months ended June 30,		Six months ended June 30,	
	2022	2021	2022	2021
	(in thousands)			
North America	$ 34,683	$ 10,204	$ 59,596	$ 19,712
Asia Pacific	168,705	116,642	317,945	220,033
Europe	17,789	20,428	47,231	40,305
Total Revenue	$ 221,177	$ 147,274	$ 424,772	$ 280,050

Our system sales revenue transactions give rise to contract liabilities (in the case of pre-payments and the fair value of goods and services to be delivered after the system delivery, such as installation and certain warranty obligations).

Contract liabilities are as follows:

	June 30, 2022	December 31, 2021
	(in thousands)	
Contract liabilities	$ 71,549	$ 68,436

Contract liabilities are reflected as deferred revenue on the consolidated balance sheet and relate to payments invoiced or received in advance of completion of performance obligations under a contract. Contract liabilities are recognized as revenue upon the fulfillment of performance obligations.

	Three months ended June 30,		Six months ended June 30,	
	2022	2021	2022	2021
	(in thousands)			
Balance, beginning of the period	$ 74,840	$ 22,142	$ 68,436	$ 23,058
Deferral of revenue	28,703	21,893	46,697	30,117
Recognition of deferred revenue	(31,994)	(8,517)	(43,584)	(17,657)
Balance, end of the period	$ 71,549	$ 35,518	$ 71,549	$ 35,518

The majority of our system transactions have payment terms of 90% due upon shipment of the system and 10% due upon acceptance. Aftermarket transaction payment terms usually provide that payment is due either within 30 or 60 days after the service is provided or parts delivered.

Note 5. Receivables and Allowances for Credit Losses

All trade receivables are reported on the Consolidated Balance Sheets at their amortized cost adjusted for any write-offs and net of allowances for credit losses.

Axcelis maintains an allowance for credit losses, which represent an estimate of expected losses over the remaining contractual life of our receivables, considering current market conditions and estimates for supportable forecasts when appropriate. The estimate is a result of the Company's ongoing assessments and evaluations of collectability, historical loss experience, and future expectations in estimating credit losses in our receivable portfolio. Axcelis uses historical loss experience rates and applies them to a related aging analysis while also considering customer and/or economic risk where appropriate. Determination of the proper amount of allowances requires management to exercise judgment about the timing, frequency and severity of credit losses that could materially affect the provision for credit losses and, as a result, net earnings. The allowance takes into consideration numerous quantitative and qualitative factors that include receivable type, historical loss experience, loss migration, delinquency trends, collection experience, current economic conditions, estimates for supportable forecasts, when appropriate, and credit risk characteristics.

Axcelis evaluates the credit risk of the customer when extending credit based on a combination of various financial and qualitative factors that may affect our customers' ability to pay. These factors may include the customer's financial condition, past payment experience, and credit bureau report, as well as the value of the underlying collateral.

Management performs detailed reviews of Axcelis' receivables on a quarterly basis to assess the adequacy of the allowances and to determine if any impairment has occurred. Amounts determined to be uncollectable are charged directly against the allowances, while amounts recovered on previously written-off accounts increase the allowances. Changes to the allowances for credit losses are maintained through adjustments to the provision for credit losses, which are charged to current period earnings.

The following table shows changes of the allowances for credit losses related to trade receivables for the three and six months ended June 30, 2022 and 2021, respectively:

	Three months ended June 30,		Six months ended June 30,	
	2022	2021	2022	2021
	(in thousands)			
Balance, beginning of period	$ —	$ —	$ —	$ —
Provision for credit losses	—	—	—	—
Charge-offs	—	—	—	—
Recoveries	—	—	—	—
Balance, end of period	$ —	$ —	$ —	$ —

Note 6. Computation of Net Earnings per Share

Basic earnings per share is computed by dividing income available to common stockholders (the numerator) by the weighted-average number of common shares outstanding (the denominator) for the period. The computation of diluted earnings per share is similar to basic earnings per share, except that the denominator is increased by the number of additional common shares that would have been outstanding if the potentially dilutive common shares issuable on exercise of stock options and vesting of RSUs had been issued, calculated using the treasury stock method.

The components of net earnings per share are as follows:

	Three months ended June 30,		Six months ended June 30,	
	2022	2021	2022	2021
	(in thousands, except per share amounts)			
Net income available to common stockholders	$ 44,189	$ 18,906	$ 85,804	$ 35,386
Weighted average common shares outstanding used in computing basic income per share	33,096	33,677	33,170	33,696
Incremental options and RSUs	466	634	600	777
Weighted average common shares used in computing diluted net income per share	33,562	34,311	33,770	34,473
Net income per share				
Basic	$ 1.34	$ 0.56	$ 2.59	$ 1.05
Diluted	$ 1.32	$ 0.55	$ 2.54	$ 1.03

Diluted weighted average common shares outstanding does not include 15,796 and 1,800 common equivalent shares issuable with respect to outstanding equity awards for the three-month periods ended June 30, 2022 and 2021, respectively, or 8,255 and 1,352 common equivalent shares issuable with respect to outstanding equity awards for the six-month periods ended June 30, 2022 and 2021, respectively, as their effect would have been anti-dilutive.

Note 7. Accumulated Other Comprehensive (Loss) Income

The following table presents the changes in accumulated other comprehensive (loss) income, net of tax, by component, for the six months ended June 30, 2022:

	Foreign currency	Defined benefit pension plan	Total
		(in thousands)	
Balance at December 31, 2021	$ 2,064	$ (299)	$ 1,765
Other comprehensive loss and pension reclassification	(3,871)	17	(3,854)
Balance at June 30, 2022	$ (1,807)	$ (282)	$ (2,089)

Note 8. Cash, cash equivalents and restricted cash

The following table provides a reconciliation of cash, cash equivalents, and restricted cash reported within the consolidated balance sheets to the total of the amounts shown in the statement of cash flows:

	June 30, 2022	December 31, 2021
	(in thousands)	
Cash and cash equivalents	$ 287,167	$ 294,923
Long-term restricted cash	753	757
Total cash, cash equivalents and restricted cash	$ 287,920	$ 295,680

As of June 30, 2022, we had $0.8 million in restricted cash representing the total of (i) cash collateral for a $0.7 million letter of credit relating to workers' compensation insurance and (ii) a $0.1 million deposit relating to customs activity.

Note 9. Inventories, net

The components of inventories are as follows:

	June 30, 2022	December 31, 2021
	(in thousands)	
Raw materials	$ 149,985	$ 133,784
Work in process	44,895	43,164
Finished goods (completed systems)	18,183	18,036
Inventories, net	$ 213,063	$ 194,984

When recorded, inventory reserves reduce the carrying value of inventories to their net realizable value. We establish inventory reserves when conditions exist that indicate inventory may be in excess of anticipated demand or is obsolete based upon assumptions about future demand for the Company's products or market conditions. We regularly evaluate the ability to realize the value of inventories based on a combination of factors including the following: forecasted sales or usage, estimated product end of life dates, estimated current and future market value and new product introductions. Purchasing and usage alternatives are also explored to mitigate inventory exposure.

Note 10. Product Warranty

We generally offer a one-year warranty for all of our systems, the terms and conditions of which vary depending upon the product sold. For all systems sold, we accrue a liability for the estimated cost of standard warranty at the time of system shipment and defer the portion of systems revenue attributable to the fair value of non-standard warranty. Costs for non-standard warranty are expensed as incurred. Factors that affect our warranty liability include the number of installed units, historical and anticipated product failure rates, material usage and service labor costs. We periodically assess the adequacy of our recorded liability and adjust the amount as necessary.

The changes in our standard product warranty liability are as follows:

	Six months ended June 30,	
	2022	2021
	(in thousands)	
Balance at January 1 (beginning of year)	$ 6,924	$ 4,612
Warranties issued during the period	4,902	3,013
Settlements made during the period	(2,819)	(1,991)
Changes in estimate of liability for pre-existing warranties during the period	12	(372)
Balance at June 30 (end of period)	$ 9,019	$ 5,262
Amount classified as current	$ 8,348	$ 4,690
Amount classified as long-term	671	572
Total warranty liability	$ 9,019	$ 5,262

Note 11. Fair Value Measurements

Certain assets on our balance sheets are reported at their fair value. Fair value is defined as the price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date.

(a) Fair Value Hierarchy

The accounting guidance for fair value measurement requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The standard establishes a fair value hierarchy based on the level of independent, objective evidence surrounding the inputs used to measure fair value. A financial instrument’s categorization within the fair value hierarchy is based upon the lowest level of input that is significant to the fair value measurement. The fair value hierarchy is as follows:

Level 1 - applies to assets or liabilities for which there are quoted prices in active markets for identical assets or liabilities.

Level 2 - applies to assets or liabilities for which there are inputs other than quoted prices that are observable for the asset or liability, such as quoted prices for similar assets or liabilities in active markets; quoted prices for identical assets or liabilities in markets with insufficient volume or infrequent transactions (less active markets); or model-derived valuations in which significant inputs are observable or can be derived principally from, or corroborated by, observable market data.

Level 3 - applies to assets or liabilities for which there are unobservable inputs to the valuation methodology that are significant to the measurement of the fair value of the assets or liabilities.

(b) Fair Value Measurements

Our money market funds and short-term investments are included in cash and cash equivalents in the consolidated balance sheets.

The following table sets forth our assets by level within the fair value hierarchy:

	June 30, 2022 Fair Value Measurements			
	Level 1	Level 2	Level 3	Total
	(in thousands)			
Assets				
Cash equivalents:				
Money market funds, U.S. Government Securities and Agency Investments	$ 255,222	$ —	$ —	$ 255,222

	December 31, 2021 Fair Value Measurements			
	Level 1	Level 2	Level 3	Total
	(in thousands)			
Assets				
Cash equivalents:				
Money market funds, U.S. Government Securities and Agency Investments	$ 261,090	$ —	$ —	$ 261,090

(c) Other Financial Instruments

The carrying amounts reflected in the consolidated balance sheets for accounts receivable, prepaid expenses and other current assets and non-current assets, restricted cash, accounts payable and accrued expenses approximate fair value due to their short-term maturities.

Note 12. Financing Arrangements

On January 30, 2015, we sold our corporate headquarters facility in Beverly, Massachusetts for $48.9 million. As part of the sale, we also entered into a 22-year lease agreement of our headquarters facility. This sale-leaseback is accounted for as a financing lease under generally accepted accounting principles and, as such, we have recorded a financing obligation of $46.9 million as of June 30, 2022. The associated lease payments include both an interest component and payment of principal, with the remaining liability being extinguished at the end of the original lease term. We posted a security deposit of $5.9 million in the form of an irrevocable letter of credit at the time of the closing. This letter of credit reduces our availability under our credit facility, as described in the next paragraph.

On July 31, 2020, we entered into a Senior Secured Credit Facilities Credit Agreement (the “Credit Agreement”) with Silicon Valley Bank, in its capacity as administrative agent and collateral agent for itself and as a lender, and such other banks and financial institutions or entities that from time to time join as lenders under the Credit Agreement. The Credit Agreement provides for a revolving credit facility in an aggregate principal amount not to exceed $40.0 million. Our obligations under the Credit Agreement are secured by a security interest, senior to any current and future debts and to any security interest, in all of our rights, title, and interest in, to and under substantially all of our assets, subject to limited exceptions, including permitted liens. The revolving credit facility terminates on July 31, 2023. As of June 30, 2022, we were in compliance with all covenant requirements of the Credit Agreement. As of such date, no borrowings had been made under the Credit Agreement, although a letter of credit for $5.9 million reduces the funds available for borrowing under the credit line. We entered into a First Amendment to the Credit Agreement with Silicon Valley Bank in March 2021 to (i) align the covenants with our stock repurchase program, and (ii) establish terms to transition from a Eurodollar based interest rate option to an interest rate benchmark using a secured overnight financing rate (known as “SOFR”) published by the Federal Reserve Bank of New York.

Note 13. Income Taxes

Income tax expense was $4.0 million for the three months ended June 30, 2022, compared to $3.8 million for the three months ended June 30, 2021. The $0.2 million increase was primarily due to a $25.4 million increase in pretax income offset by the Foreign Derived Intangible Income (“FDII”) deduction on export sales. Income tax expense was $8.3 million during the six months ended June 30, 2022, compared with $5.6 million for the six months ended June 30, 2021.

The $2.7 million increase was primarily due to a $53.1 million increase in pretax income offset by the FDII deduction on export sales.

The effective tax rate for the three and six months ended June 30, 2022 was less than the U.S. statutory rate of 21% due to forecasted FDII, Federal research and development tax credits and a favorable discrete item related to equity compensation that reduces the annual tax rate. The effective tax rate for the three and six months ended June 30, 2021 was less than the U.S. statutory rate of 21% due to favorable discrete items related to equity compensation in the period and Federal research and development tax credits that reduce the annual tax rate.

The Deferred income taxes of $33.7 million and $35.5 million as of June 30, 2022 and December 31, 2021, respectively, reflect the net tax effect of temporary differences between the carrying amount of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes, as well as the tax effect of carryforwards. We have recorded a $8.9 million valuation allowance in the U.S. against certain tax credits and state net operating losses due to the uncertainty of their realization. Realization of our net deferred tax assets is dependent on future taxable income. We believe it is more likely than not that such assets will be realized; however, ultimate realization could be impacted by market conditions and other variables not known or anticipated at this time.

Note 14. Concentration of Risk

For the three months ended June 30, 2022, two customers accounted for 19.3% and 11.6% of total revenue, respectively. For the three months ended June 30, 2021, two customers accounted for 19.7% and 10.2% of total revenue.

For the six months ended June 30, 2022, three customers accounted for 15.3%, 10.7% and 10.3% of total revenue, respectively. For the six months ended June 30, 2021, one customer accounted for 24.4% of total revenue.

At June 30, 2022, three customers accounted for 30.5%, 13.2% and 10.6% of accounts receivable, respectively. At December 31, 2021, two customers accounted for 29.1% and 13.6% of accounts receivable, respectively.

Note 15. Share Repurchase

In February 2022, our Board of Directors approved stock repurchases of up to $100 million of our common stock, beginning in March 2022. During the six months ended June 30, 2022, we purchased 0.5 million shares at an average cost of $65.19 per share. The timing and actual number of shares repurchased under this program will depend on various factors including price, corporate and regulatory requirements, alternative investment opportunities and other market conditions.

Shares repurchased by us are accounted for when the transaction is settled. Shares repurchased are returned to the status of authorized but unissued shares. Accordingly, the repurchases are deducted from common stock for par value and from additional paid-in capital for the excess over par value. If additional paid-in capital has been exhausted, the excess over par value is deducted from retained earnings. Direct costs incurred to acquire the shares are included in the total cost of the shares.

Note 16. Contingencies

(a) Litigation

We are from time to time a party to litigation that arises in the normal course of our business operations. We are not presently a party to any litigation that we believe might have a material adverse effect on our business operations.

(b) Indemnifications

Our system sales agreements typically include provisions under which we agree to take certain actions, provide certain remedies and defend our customers against third-party claims of intellectual property infringement under specified conditions and indemnify customers against any damage and costs awarded in connection with such claims. We have not incurred any material costs as a result of such indemnifications and have not accrued any liabilities related to such obligations in the accompanying consolidated financial statements

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations.

Certain statements within "Management's Discussion and Analysis of Financial Condition and Results of Operations" are forward-looking statements that involve risks and uncertainties. Words such as may, will, should, would, anticipates, expects, intends, plans, believes, seeks, estimates and similar expressions identify such forward-looking statements. The forward-looking statements contained herein are based on current expectations and entail various risks and uncertainties that could cause actual results to differ materially from those expressed in such forward-looking statements. Factors that might cause such a difference include, among other things, those set forth under "Liquidity and Capital Resources" below and under "Risk Factors" in Part I, Item 1A to our annual report on Form 10-K for the year ended December 31, 2021, which discussion is incorporated herein by reference. Readers are cautioned not to place undue reliance on these forward-looking statements, which reflect management's analysis only as of the date hereof. We assume no obligation to update these forward-looking statements to reflect actual results or changes in factors or assumptions affecting forward-looking statements, except as may be required by law.

Overview

We are primarily a producer of ion implantation equipment used in the fabrication of semiconductor chips in the United States, Europe and Asia. In addition, we provide extensive worldwide aftermarket service and support, including spare parts, equipment upgrades and maintenance services to the semiconductor industry. Our product development and manufacturing activities currently occur primarily in the United States and South Korea. Our equipment and service products are highly technical and are sold through a direct sales force in the United States, Europe and Asia. Consolidation and partnering within the semiconductor manufacturing industry has resulted in a small number of customers representing a substantial portion of our business. Our ten largest customers accounted for 62.9% of total revenue for the six months ended June 30, 2022.

For Axcelis and the rest of our industry, the first half of 2022 has been a continuation of the unprecedented demand for chips and the capital equipment required to produce them that characterized 2021. At the same time, supply chain challenges also continued during the first half of 2022. Axcelis' strong results in the first six months of 2022, demonstrate our ability to meet demand and manage supply chain difficulties. The growing mature process technology market continues to be an area of strength for Axcelis, with 82% of first half 2022 shipments going to mature foundry/logic customers.

Critical Accounting Estimates

Management's discussion and analysis of our financial condition and results of operations included herein and in our Annual Report on Form 10-K for the year ended December 31, 2021 are based upon our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires management to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses and related disclosure of contingent assets and liabilities. On an ongoing basis, we evaluate our estimates and assumptions. Management's estimates are based on historical experience and on various other assumptions that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

Management has not identified any need to make any material change in, and has not changed, any of our critical accounting estimates and judgments as described in Management's Discussion and Analysis of Financial Condition and Results of Operations included in our Annual Report on Form 10-K for the year ended December 31, 2021.

Results of Operations

The following table sets forth our results of operations as a percentage of total revenue:

	Three months ended June 30, 2022	Three months ended June 30, 2021	Six months ended June 30, 2022	Six months ended June 30, 2021
Revenue:				
Product	96.7 %	95.2 %	96.6 %	95.3 %
Services	3.3	4.8	3.4	4.7
Total revenue	100.0	100.0	100.0	100.0
Cost of revenue:				
Product	52.4	52.1	52.6	52.5
Services	2.8	4.5	2.9	4.5
Total cost of revenue	55.2	56.6	55.5	57.0
Gross profit	44.8	43.4	44.5	43.0
Operating expenses:				
Research and development	8.5	11.3	8.4	11.5
Sales and marketing	5.7	8.3	5.6	8.1
General and administrative	6.1	7.6	6.2	7.6
Total operating expenses	20.3	27.2	20.2	27.2
Income from operations	24.5	16.2	24.3	15.8
Other (expense) income:				
Interest income	0.2	—	0.1	—
Interest expense	(0.6)	(0.9)	(0.7)	(0.8)
Other, net	(2.3)	—	(1.6)	(0.4)
Total other expense	(2.7)	(0.9)	(2.2)	(1.2)
Income before income taxes	21.8	15.3	22.1	14.6
Income tax provision	1.8	2.6	1.9	2.0
Net income	20.0 %	12.7 %	20.2 %	12.6 %

Revenue

The following table sets forth our product and services revenue:

	Three months ended June 30, 2022	Three months ended June 30, 2021	Period-to-Period Change $	Period-to-Period Change %	Six months ended June 30, 2022	Six months ended June 30, 2021	Period-to-Period Change $	Period-to-Period Change %
	(dollars in thousands)							
Revenue:								
Product	$ 213,926	$ 140,156	$ *73,770*	*52.6 %*	$ 410,458	$ 266,765	$ 143,693	*53.9 %*
Percentage of revenue	*96.7 %*	*95.2 %*			*96.6 %*	*95.3 %*		
Services	7,251	7,118	*133*	*1.9 %*	14,314	13,285	1,029	*7.7 %*
Percentage of revenue	*3.3 %*	*4.8 %*			*3.4 %*	*4.7 %*		
Total revenue	$ 221,177	$ 147,274	$ 73,903	*50.2 %*	$ 424,772	$ 280,050	$ 144,722	*51.7 %*

Three months ended June 30, 2022 Compared with Three months ended June 30, 2021

Product

Product revenue, which includes systems sales, sales of spare parts, product upgrades and used systems was $213.9 million, or 96.7% of revenue during the three months ended June 30, 2022, compared with $140.2 million, or 95.2% of revenue for the three months ended June 30, 2021. The $73.7 million increase in product revenue for the three-month period ending June 30, 2022, in comparison to the same period in 2021, was primarily driven by an increase in the number of systems sold.

A portion of our revenue from systems sales is deferred until installation and other services related to future performance obligations are performed. The total amount of deferred revenue at June 30, 2022 and December 31, 2021 was $71.5 million and $68.4 million, respectively. The increase in deferred revenue was primarily due to the number of systems sold.

Services

Services revenue, which includes the labor component of maintenance and service contracts and fees for service hours provided by on-site service personnel, was $7.3 million, or 3.3% of revenue for the three months ended June 30, 2022, compared with $7.1 million, or 4.8% of revenue for the three months ended June 30, 2021. Although services revenue typically increases with the expansion of the installed base of systems, it can fluctuate from period to period based on capacity utilization at customers' manufacturing facilities, which affects the need for equipment service.

Six months ended June 30, 2022 Compared with Six months ended June 30, 2021

Product

Product revenue was $410.5 million, or 96.6% of revenue during the six months ended June 30, 2022, compared with $266.8 million, or 95.3% of revenue for the six months ended June 30, 2021. The $143.7 million increase in product revenue for the six-month period ending June 30, 2022, in comparison to the same period in 2021, was primarily driven by an increase in the number of systems sold.

Services

Services revenue was $14.3 million, or 3.4% of revenue for the six months ended June 30, 2022, compared with $13.3 million, or 4.7% of revenue for the six months ended June 30, 2021.

Revenue Categories used by Management

In addition to the line item revenue categories discussed above, management also regularly disaggregates revenue in the following categories, which it finds relevant and useful:

- Systems and Aftermarket revenues, in which "Aftermarket" is:
  A. The portion of Product revenue relating to spare parts, product upgrades and used equipment, combined with
  B. Services revenue, which is the labor component of Aftermarket revenues

  (Aftermarket purchases reflect current fab utilization as opposed to Systems purchases which reflect capital investment decisions by our customers, which have differing economic drivers);

- Revenue by geographic regions, since economic factors impacting customer purchasing decisions may vary by geographic region; and

- Revenue by our customer market segments, since they can be subject to different economic drivers at different periods of time, impacting a customer's likelihood of purchasing capital equipment during any particular period. Currently, management references three customer market segments: memory, mature technology processes and leading edge foundry and logic.

Aftermarket and Systems Revenue

Three months ended June 30, 2022 Compared with Three months ended June 30, 2021

Included in total revenue of $221.2 million during the three months ended June 30, 2022 is revenue from our Aftermarket business of $55.8 million, compared with $47.1 million of aftermarket revenue for the three months ended June 30, 2021. Aftermarket revenue fluctuates from period to period based on capacity utilization at customers' manufacturing facilities, which affects the sale of spare parts and demand for equipment service. Aftermarket revenue can also fluctuate from period to period based on the demand for system upgrades or used equipment. The remaining $165.4 million of revenue for the three months ended June 30, 2022 was from system sales, compared with $100.2 million of systems revenue for the three months ended June 30, 2021. Systems revenue fluctuates from period to period based on our customers' capital spending.

Six months ended June 30, 2022 Compared with Six months ended June 30, 2021

Included in total revenue of $424.8 million during the six months ended June 30, 2022 is revenue from our Aftermarket business of $107.6 million, compared with $98.9 million of aftermarket revenue for the six months ended June 30, 2021. The remaining $317.2 million of revenue for the six months ended June 30, 2022 was from system sales, compared with $181.2 million of systems revenue for the six months ended June 30, 2021.

Gross Profit / Gross Margin

The following table sets forth our gross profit / gross margin:

	Three months ended June 30,		Period-to-Period Change		Six months ended June 30,		Period-to-Period Change	
	2022	2021	$	%	2022	2021	$	%
	(dollars in thousands)							
Gross Profit:								
Product	$ 98,172	$ 63,468	$ 34,704	*54.7 %*	$ 187,063	$ 119,743	$ 67,320	*56.2 %*
Product gross margin	*45.9 %*	*45.3 %*			*45.6 %*	*44.9 %*		
Services	1,009	546	463	*84.8 %*	1,885	706	1,179	*167.0 %*
Services gross margin	*13.9 %*	*7.7 %*			*13.2 %*	*5.3 %*		
Total gross profit	$ 99,181	$ 64,014	$ 35,167	*54.9 %*	$ 188,948	$ 120,449	$ 68,499	*56.9 %*
Gross margin	*44.8 %*	*43.4 %*			*44.5 %*	*43.0 %*		

Three months ended June 30, 2022 Compared with Three months ended June 30, 2021

Product

Gross margin from product revenue was 45.9% for the three months ended June 30, 2022, compared to 45.3% for the three months ended June 30, 2021. The increase in gross margin resulted from improved margins on Purion systems.

Services

Gross margin from services revenue was 13.9% for the three months ended June 30, 2022, compared to 7.7% for the three months ended June 30, 2021. The increase in gross margin is attributable to changes in the mix of service contracts.

Six months ended June 30, 2022 Compared with Six months ended June 30, 2021

Product

Gross margin from product revenue was 45.6% for the six months ended June 30, 2022, compared to 44.9% for the six months ended June 30, 2021. The increase in gross margin resulted from improved margins on Purion systems.

Services

Gross margin from services revenue was 13.2% for the six months ended June 30, 2022, compared to 5.3% for the six months ended June 30, 2021. The increase in gross margin is attributable to changes in the mix of service contracts.

Operating Expenses

The following table sets forth our operating expenses:

	Three months ended June 30,		Period-to-Period Change		Six months ended June 30,		Period-to-Period Change	
	2022	2021	$	%	2022	2021	$	%
				(dollars in thousands)				
Research and development	$ 18,731	$ 16,623	$ 2,108	*12.7 %*	$ 35,704	$ 32,308	$ 3,396	*10.5 %*
Percentage of revenue	*8.5 %*	*11.3 %*			*8.4 %*	*11.5 %*		
Sales and marketing	12,703	12,177	526	*4.3 %*	23,994	22,564	1,430	*6.3 %*
Percentage of revenue	*5.7 %*	*8.3 %*			*5.6 %*	*8.1 %*		
General and administrative	13,602	11,217	2,385	*21.3 %*	26,180	21,230	4,950	*23.3 %*
Percentage of revenue	*6.1 %*	*7.6 %*			*6.2 %*	*7.6 %*		
Total operating expenses	$ 45,036	$ 40,017	$ 5,019	*12.5 %*	$ 85,878	$ 76,102	$ 9,776	*12.8 %*
Percentage of revenue	*20.3 %*	*27.2 %*			*20.2 %*	*27.2 %*		

Our operating expenses consist primarily of personnel costs, including salaries, commissions, incentive-based compensation, stock-based compensation and related benefits and taxes; project material costs related to the design and development of new products and enhancement of existing products; and professional fees, travel and depreciation expenses.

Personnel costs are our largest expense, representing $27.4 million or 60.9% of our total operating expenses for the three months ended June 30, 2022, compared to $25.4 million or 63.5% of our total operating expenses for the three months ended June 30, 2021. Personnel costs were $51.6 million or 60.1% of our total operating expenses for the six months ended June 30, 2022, compared to $47.5 million or 62.4% of our total operating expenses for the six months ended June 30, 2021. The higher personnel costs for the three and six months ended June 30, 2022 are primarily due to increases in personnel-related expenses to support growth as well as an increase in incentive-based pay expense due to strong financial performance.

Research and Development

	Three months ended June 30,		Period-to-Period Change		Six months ended June 30,		Period-to-Period Change	
	2022	2021	$	%	2022	2021	$	%
				(dollars in thousands)				
Research and development	$ 18,731	$ 16,623	$ 2,108	*12.7 %*	$ 35,704	$ 32,308	$ 3,396	*10.5 %*
Percentage of revenue	*8.5 %*	*11.3 %*			*8.4 %*	*11.5 %*		

Our ability to remain competitive depends largely on continuously developing innovative technology, with new and enhanced features and systems and introducing them at competitive prices on a timely basis. Accordingly, based on our strategic plan, we establish annual R&D budgets to fund programs that we expect will solve customers' high value, high impact, ion implantation challenges.

Three months ended June 30, 2022 Compared with Three months ended June 30, 2021

Research and development expense was $18.7 million during the three months ended June 30, 2022, an increase of $2.1 million, or 12.7%, compared with $16.6 million during the three months ended June 30, 2021. The increase is primarily due to higher personnel expenses including an increase in incentive-based pay expense as well as an increase in project materials and related services for ongoing projects.

Six months ended June 30, 2022 Compared with Six months ended June 30, 2021

Research and development expense was $35.7 million during the six months ended June 30, 2022, an increase of $3.4 million, or 10.5%, compared with $32.3 million during the six months ended June 30, 2021. The increase is primarily due to higher personnel expenses including an increase in incentive-based pay expense as well as an increase in project materials and related services for ongoing projects.

Sales and Marketing

	Three months ended June 30,		Period-to-Period Change		Six months ended June 30,		Period-to-Period Change	
	2022	2021	$	%	2022	2021	$	%
	(dollars in thousands)							
Sales and marketing	$ 12,703	$ 12,177	$ 526	*4.3 %*	$ 23,994	$ 22,564	$ 1,430	*6.3 %*
Percentage of revenue	*5.7 %*	*8.3 %*			*5.6 %*	*8.1 %*		

Our sales and marketing expenses result primarily from the sale of our equipment and services through our direct sales force.

Three months ended June 30, 2022 Compared with Three months ended June 30, 2021

Sales and marketing expense was $12.7 million during the three months ended June 30, 2022, an increase of $0.5 million, or 4.3%, compared with $12.2 million during the three months ended June 30, 2021. The increase is primarily due to higher personnel expenses including an increase in incentive-based pay expense and freight expense.

Six months ended June 30, 2022 Compared with Six months ended June 30, 2021

Sales and marketing expense was $24.0 million during the six months ended June 30, 2022, an increase of $1.4 million, or 6.3%, compared with $22.6 million during the three months ended June 30, 2021. The increase is primarily due to higher personnel expenses including an increase in incentive-based pay expense and freight expense.

General and Administrative

	Three months ended June 30,		Period-to-Period Change		Six months ended June 30,		Period-to-Period Change	
	2022	2021	$	%	2022	2021	$	%
	(dollars in thousands)							
General and administrative	$ 13,602	$ 11,217	$ 2,385	*21.3 %*	$ 26,180	$ 21,230	$ 4,950	*23.3 %*
Percentage of revenue	*6.1 %*	*7.6 %*			*6.2 %*	*7.6 %*		

Our general and administrative expenses result primarily from the costs associated with our executive, finance, information technology, legal and human resource functions.

Three months ended June 30, 2022 Compared with Three months ended June 30, 2021

General and administrative expense was $13.6 million during the three months ended June 30, 2022, an increase of $2.4 million, or 21.3%, compared with $11.2 million during the three months ended June 30, 2021. The increase is primarily due to an increase in personnel expenses and professional fees.

Six months ended June 30, 2022 Compared with Six months ended June 30, 2021

General and administrative expense was $26.2 million during the six months ended June 30, 2022, an increase of $5.0 million, or 23.3%, compared with $21.2 million during the six months ended June 30, 2021. The increase is primarily due to an increase in personnel expenses and professional fees.

Other (Expense) Income

	Three months ended June 30,		Period-to-period change		Six months ended June 30,		Period-to-period change	
	2022	2021	$	%	2022	2021	$	%
	(dollars in thousands)							
Other expense	$ (5,949)	$ (1,249)	$ (4,700)	*376.3* %	$ (8,990)	$ (3,398)	$ (5,592)	*164.6* %
Percentage of revenue	*(2.7)%*	*(0.9)%*			*(2.2)%*	*(1.2)%*		

Other (expense) income consists primarily of interest expense relating to the finance lease obligation we incurred in connection with the 2015 sale of our headquarters facility and other financing obligations, foreign exchange gains and losses attributable to fluctuations of the U.S. dollar against local currencies of certain of the countries in which we operate as well as interest earned on our invested cash balances.

Other expense was $5.9 million for the three months ended June 30, 2022, compared with $1.2 million for the three months ended June 30, 2021. The increase in other expense was primarily due to an increase in foreign currency exchange losses. Other expense was $9.0 million for the six months ended June 30, 2022, compared with $3.4 million for the six months ended June 30, 2021. The increase in other expense was primarily due to an increase in foreign currency exchange losses.

During the six-month periods ended June 30, 2022 and 2021, we had no significant off-balance-sheet risk such as exchange contracts, option contracts or other hedging arrangements.

Income Tax Provision

	Three months ended June 30,		Period-to-period change		Six months ended June 30,		Period-to-period change	
	2022	2021	$	%	2022	2021	$	%
	(dollars in thousands)							
Income tax provision	$ 4,007	$ 3,842	$ 165	*4.3* %	$ 8,276	$ 5,563	$ 2,713	*48.8* %
Percentage of revenue	*1.8* %	*2.6* %			1.9 %	2.0 %		

Income tax expense was $4.0 million for the three months ended June 30, 2022, compared to $3.8 million for the three months ended June 30, 2021. The $0.2 million increase was primarily due to a $25.4 million increase in pretax income offset by the FDII deduction on export sales. Income tax expense was $8.3 million for the six months ended June 30, 2022, compared to $5.6 million for the six months ended June 30, 2021. The $2.7 million increase was primarily due to a $53.1 million increase in pretax income offset by the FDII deduction on export sales.

The effective tax rate for the three and six months ended June 30, 2022 was less than the U.S. statutory rate of 21% due to forecasted FDII deductions, Federal research and development tax credits and a favorable discrete item related to equity compensation that reduces the annual tax rate. The effective tax rate for the three and six months ended June 30, 2021 was less than the U.S. statutory rate of 21% due to favorable discrete items related to equity compensation in the period and Federal research and development tax credits that reduce the annual tax rate.

The deferred income taxes of $33.7 million and $35.5 million as of June 30, 2022 and December 31, 2021, respectively, reflect the net tax effect of temporary differences between the carrying amount of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes, as well as the tax effect of carryforwards. We have recorded a $8.9 million valuation allowance in the U.S. against certain tax credits and state net operating losses due to the uncertainty of their realization. Realization of our net deferred tax assets is dependent on future taxable income. We believe it is more likely than not that such assets will be realized; however, ultimate realization could be impacted by market conditions and other variables not known or anticipated at this time.

Liquidity and Capital Resources

We had $287.2 million in unrestricted cash and cash equivalents at June 30, 2022, in addition to $0.8 million in restricted cash. Management believes that maintaining a strong cash balance is necessary to fund ramps in our business which can require significant cash investment to meet sudden demand. Additionally, we are using cash in our stock repurchase program and are considering both organic and inorganic opportunities to drive future growth, for which cash resources will be necessary.

Our liquidity is affected by many factors. Some of these relate specifically to the operations of our business, for example, the rate of sale of our products, and others relate to the uncertainties of global economic conditions, including the availability of credit and the condition of the overall semiconductor equipment industry. Our established cost structure, other than cost of goods sold, does not vary significantly with changes in volume. We experience fluctuations in operating results and cash flows depending on these factors. Stock repurchases, as discussed below, also reduce our cash balances.

During the six months ended June 30, 2022 and 2021, we generated $29.2 million and $45.9 million, respectively, of cash related to operating activities.

Investing activities for the six months ended June 30, 2022 and 2021 resulted in cash outflows of $3.4 million and $2.4 million, respectively, used for capital expenditures.

Financing activities for the six months ended June 30, 2022 resulted in a cash usage of $40.7 million. During the first six months of 2022, $32.5 million in cash was used to repurchase our common stock and $9.2 million was used for payments to government tax authorities for income tax withholding on employee compensation arising from the vesting of RSUs, where units are withheld by the Company for taxes, as well as $0.5 million relating to the reduction of the liability under the finance lease of our corporate headquarters. These amounts were partially offset by $1.5 million of proceeds from the exercise of stock options and purchase of shares under our 2020 ESPP during the first six months of 2022. In comparison, financing activities for the six months ended June 30, 2021 resulted in cash usage of $28.3 million, $25.0 million of which related to the repurchase of our common stock and $6.5 million related to payments made to government tax authorities for income tax withholding on employee compensation arising from the vesting of RSUs, as well as $0.4 million relating to the reduction of our financing lease liability. These amounts were partially offset by $3.6 million of proceeds related to the exercise of stock options during the first six months of 2021.

Under the rules of the U.S. Securities and Exchange Commission (the "SEC"), we qualify as a "well-known seasoned issuer," which allows us to file shelf registration statements to register an unspecified amount of securities that are effective upon filing. On May 29, 2020, we filed such a shelf registration statement with the SEC for the issuance of an unspecified amount of common stock, preferred stock, various series of debt securities and/or warrants to purchase any of such securities, either individually or in units, from time to time at prices and on terms to be determined at the time of any such offering. This registration statement was effective upon filing and will remain in effect for up to three years from filing, prior to which time we may file another shelf registration statement to maintain the availability of this financing option.

On July 31, 2020, we entered into a Senior Secured Credit Facilities Credit Agreement (the "Credit Agreement") with Silicon Valley Bank. The Credit Agreement provides for a revolving credit facility in an aggregate principal amount not to exceed $40.0 million. Our obligations under the Credit Agreement are secured by a security interest, senior to any current and future debts and to any security interest, in all of our rights, title, and interest in, to and under substantially all of our assets, subject to limited exceptions, including permitted liens. The revolving credit facility terminates on July 31, 2023. As of June 30, 2022, we were in compliance with all covenant requirements of the Credit Agreement. As of such date, no borrowings had been made under the Credit Agreement, although a letter of credit for $5.9 million reduces the funds available for borrowing under the credit line. We have no immediate plans to borrow under the Credit Agreement, but we will use the facility for letters of credit, for ongoing working capital needs and to fund general corporate purposes, as desired. We entered into a First Amendment to the Credit Agreement with Silicon Valley Bank in March 2021 to (i) align the covenants with our stock repurchase program, and (ii) establish terms to transition from a Eurodollar based interest rate option to an interest rate benchmark using a secured overnight financing rate (known as "SOFR") published by the Federal Reserve Bank of New York.

We believe that based on our current market, revenue, expense and cash flow forecasts, our existing cash, cash equivalents and equity and debt financing capacity will be sufficient to satisfy our anticipated cash requirements for the short and long-term.

Commitments and Contingencies

Significant commitments and contingencies at June 30, 2022 are consistent with those discussed in Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations," and Note 16 to the consolidated financial statements in our Annual Report on Form 10-K for the fiscal year ended December 31, 2021.

Item 3. Quantitative and Qualitative Disclosures about Market Risk.

As of June 30, 2022, there have been no material changes to the quantitative information about market risk disclosed in Item 7A to our Annual Report on Form 10-K for the year ended December 31, 2021.

Item 4. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our principal executive officer and principal financial officer, has evaluated the effectiveness of our disclosure controls and procedures (as defined in Rule 13a-15(e) under the Securities Exchange Act of 1934, as amended (the "Exchange Act")) as of the end of the period covered by this report (the "Evaluation Date"). Based on this evaluation, our principal executive officer and principal financial officer concluded that, as of the Evaluation Date, these disclosure controls and procedures are effective.

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting (as defined in Rule 13a-15(f) under the Exchange Act) identified in connection with the evaluation of our internal control that occurred during the three months ended June 30, 2022 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

PART II—OTHER INFORMATION

Item 1. Legal Proceedings.

We are, from time to time, a party to litigation that arises in the normal course of our business operations. We are not presently a party to any litigation that we believe might have a material adverse effect on our business operations.

Item 1A. Risk Factors.

As of June 30, 2022, there have been no material changes to the risk factors described in Item 1A to our Annual Report on Form 10-K for the year ended December 31, 2021.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds.

In February 2022, our Board of Directors authorized a share repurchase program for up to $100 million of the Company's common stock.

The following table summarizes the stock repurchase activity, based upon settlement date, for the three months ended June 30, 2022 as well as the approximate dollar value of shares that may yet be purchased pursuant to our stock repurchase program:

	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Program	Approximate Dollar Value of Shares that May Yet Be Purchased Under the Program
	(in thousands except per share amounts)			
April 1, 2022 through April 30, 2022	45	$60.36	45	$ 77,284
May 1, 2022 through May 31, 2022	60	$56.44	60	73,885
June 1, 2022 through June 30, 2022	110	$58.30	110	$ 67,502
Total	215		215	

Item 3. Defaults Upon Senior Securities.

None.

Item 4. Mine Safety Disclosures.

Not Applicable.

Item 5. Other Information.

None.

Item 6. Exhibits.

The following exhibits are filed herewith:

Exhibit No	Description
3.1	Restated Certificate of Incorporation of the Company filed November 2, 2017. Incorporated by reference to Exhibit 3.1 of the Company's Form 10-Q filed with the Commission on November 3, 2017.
3.2	Bylaws of the Company, as amended as of May 11, 2022. Incorporated by reference to Exhibit 3.2 of the Company's Form 8-K filed with the Commission on May 11, 2022.
10.1	2022 Amended and Restated Employment Agreement between the Company and Mary G. Puma dated May 24, 2022. Filed herewith.
31.1	Certification of the Principal Executive Officer under Exchange Act Rule 13a-14(a)/15d-14(a) (Section 302 of the Sarbanes-Oxley Act), dated August 4, 2022. Filed herewith.
31.2	Certification of the Principal Financial Officer under Exchange Act Rule 13a-14(a)/15d-14(a) (Section 302 of the Sarbanes-Oxley Act), dated August 4, 2022. Filed herewith.
32.1	Certification of the Principal Executive Officer pursuant to Section 1350 of Chapter 63 of title 18 of the United States Code (Section 906 of the Sarbanes-Oxley Act), dated August 4, 2022. Filed herewith.
32.2	Certification of the Principal Financial Officer pursuant to Section 1350 of Chapter 63 of title 18 of the United States Code (Section 906 of the Sarbanes-Oxley Act), dated August 4, 2022. Filed herewith.
101	The following materials from the Company's Form 10-Q for the quarter ended June 30, 2022, formatted in inline eXtensible Business Reporting Language (iXBRL): (i) Consolidated Statements of Operations, (ii) Consolidated Statements of Comprehensive Income, (iii) Consolidated Balance Sheets, (iv) Consolidated Statements of Cash Flows and (v) Notes to Consolidated Financial Statements (Unaudited). Filed herewith.
104	Cover Page Interactive Data File (formatted as iXBRL and contained in Exhibit 101).

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

	AXCELIS TECHNOLOGIES, INC.
DATED: August 4, 2022	By: /s/ KEVIN J. BREWER
	Kevin J. Brewer *Executive Vice President and Chief Financial Officer* *Duly Authorized Officer and Principal Financial Officer*

AXCELIS TECHNOLOGIES, INC.

2022 AMENDED AND RESTATED EMPLOYMENT AGREEMENT

Mary G. Puma

The parties to this 2022 Amended and Restated Employment Agreement, dated as of May 24, 2022 (“Agreement”), are AXCELIS TECHNOLOGIES, INC., a Delaware, USA, corporation (the “Company”), and MARY G. PUMA, an individual residing in the State of New Hampshire, USA (the “Executive”). The Company and the Executive are party to an Amended and Restated Employment Agreement effective as of November 6, 2007 (“Current Agreement”). The parties desire to amend and restate the Current Agreement. This Agreement provides for the continued employment of the Executive upon the terms and conditions of set forth herein. The execution and delivery of this Agreement have been duly authorized by the Board of Directors of the Company (the “Board”). This Agreement shall become effective on May 24, 2022 (the “Effective Date”).

NOW, THEREFORE, the Company and the Executive, each intending to be legally bound, hereby mutually covenant and agree as follows:

1. **Employment and Term**.

1.1. Employment. The Company hereby continues to employ the Executive as the President and Chief Executive Officer of the Company and the Executive hereby accepts such continued employment with the Company, for the Term set forth in Paragraph 1.2.

1.2. Term. The term of the Executive’s employment under this Agreement (the “Term”) shall commence on the Effective Date and end as set forth in Section 7.

2. **Duties**. During the period of employment as provided in Paragraph 1.2 hereof, the Executive shall serve as President and Chief Executive Officer of the Company. The Executive shall report to the Board of Directors and perform duties consistent with her positions. The Executive shall devote her best skill and efforts (reasonable sick leave and vacations excepted) to the performance of her duties under this Agreement. In addition, the Executive may devote reasonable periods required for (i) subject to the review and approval of the Board of Directors, serving as a director or member of a committee of any organization involving no conflict of interest with the interests of the Company or its subsidiaries; (ii) fulfilling speaking engagements (iii) engaging in charitable and community activities; (iv) participating in industry and trade organization activities; and (v) managing her personal investments; provided, that such activities do not materially interfere with the regular performance of her duties and responsibilities under this Agreement.

3. **Base Salary**. For services performed by the Executive for the Company pursuant to this Agreement during the period of employment as provided in Paragraph 1.2, the Company shall pay the Executive a base salary at the rate of at least $625,000 per year, payable in accordance with the Company's regular payroll practices (but no less frequently than monthly). Any compensation which may be paid to the Executive under any additional compensation or incentive plan of the Company or which may be otherwise authorized from time to time by the Board (or an appropriate committee thereof) shall be in addition to the base salary to which the Executive shall be entitled under this Agreement.

4. **Salary Increases**. During the Term, the base salary of the Executive shall be reviewed no less frequently than annually by the Board to determine whether or not the same should be increased in light of the duties and responsibilities of the Executive and her performance thereof, and, if it is determined that an increase is merited, such increase shall be put into effect at the time determined by the Board and the base salary of the Executive as so increased shall thereafter constitute the base salary of the Executive for purposes of Paragraph 3.

5. **Other Benefits**. In addition to the base salary to be paid to the Executive pursuant to Paragraph 3 hereof, the Executive shall also be entitled to the following:

5.1. <u>Participation in Plans</u>. The Executive shall be entitled to a bonus opportunity for each fiscal year based on the attainment of performance goals and objectives established by the Board; such amount shall be 100% of base salary at the rate in effect for such year if target level performance is achieved and such greater or lesser amount if actual performance exceeds or falls short of target performance goals and objectives as provided under the Company's bonus arrangements for senior executives. Any such bonus shall be vested as and when approved by the Board of Directors and vested bonuses shall be payable by the Company not later than the end of the fiscal year in which such bonus vests. The Executive shall also be eligible to participate in the various benefit plans maintained in force by the Company from time to time, including any qualified and nonqualified pension, supplemental pension, disability, medical, group life insurance, supplemental life insurance coverage, business travel insurance, sick leave, and other similar retirement and welfare benefit plans, programs and arrangements.

5.2. <u>Equity Grants</u>.

5.2.1. <u>Discretionary Grants</u>. The Board (or a committee appointed by the Board for such purposes) may hereafter make additional grants under the Company's 2012 Stock Plan, or any successor plan, as it determines appropriate in its discretion, subject to the terms of Paragraph 5.2.2 below.

5.2.2. <u>Grants in 2023 and 2024</u>.

(a) *Performance RSU in 2023*.The Company shall, at a minimum, grant a performance based Restricted Stock Unit ("RSU") award to the Executive on May 15, 2023 (regardless of whether Executive's Retirement (as defined in Paragraph 7.4.6) has occurred prior to or on that date and regardless of whether Executive is employed on that date) having a value equal to the performance based RSU granted to the Executive in 2022 (or, if a greater value is shown in the most recent compensation report obtained by the Company, then 50% of the median value for an annual equity award to a CEO in that report), and having substantially the same terms (other than the performance goals) as the 2022 grant. Such performance based RSU shall remain outstanding without regard to Executive's Retirement or termination of employment, and 50% of the earned RSUs shall vest on February 28, 2024 (regardless of whether Executive's Retirement has occurred prior to or on that date and regardless of whether Executive is employed on that date), with the remaining 50% of the earned RSUs vesting on the earliest of (i) February 28, 2024 if the Executive's Retirement (as defined in Section 7.4.6) has occurred on or prior to that date, (ii) the date of Executive's Retirement after February 28, 2024, or (iii) February 28, 2025.

(b) *Contingent Service RSU in 2024*. In the event that the Executive does not receive a service based RSU in 2023, but continues to serve as Chief Executive Officer after December 31, 2023, then the Company shall grant a service based RSU award to the Executive on January 15, 2024 having a value equal to the service based RSU granted to the Executive in 2022 (or, if a greater value is shown in the most recent compensation report obtained by the Company, then 50% of the median value for an annual equity award to a CEO in that report), and having substantially the same terms as the 2022 grant, provided such RSU would be 25% vested at grant, and 25% on each anniversary of the date of grant, subject to acceleration of an additional 25% of the RSUs upon the Executive's Retirement. Service based RSUs that are not vested as of Executive's Retirement shall forfeit.

5.3. Fringe Benefits. In addition to the foregoing, the Executive shall be entitled to an office, fringe benefits and other similar benefits no less favorable than those available to other senior executives of the Company.

5.4. Expense Reimbursement. The Company shall reimburse the Executive, upon a proper accounting, for reasonable business expenses and disbursements incurred by her in the course of the performance of her duties under this Agreement.

5.5. Vacation. The Executive shall be entitled to vacation and paid time off during the initial and each successive year during the Term of this Agreement in accordance with the Company's policies applicable to senior executives, or such greater period as the Board shall approve, without reduction in salary or other benefits.

6. **Covenants of the Employee**. In order to induce the Company to enter into this Agreement, the Executive hereby agrees as follows:

6.1. Confidentiality. Except as may be required by law and for acts in the ordinary course of the Executive's performance of her duties for the Company and believed by the Executive in good faith to be in the best interests of the Company, the Executive shall keep confidential and shall not divulge to any other person or entity, during the Term or thereafter, any of the business secrets or other confidential information regarding the Company, or any of its subsidiaries or affiliates, which has not otherwise become public knowledge.

6.2. Records. All papers, books and records of every kind and description relating to the business and affairs of the Company, or any of its subsidiaries or affiliates, whether or not prepared by the Executive shall be the sole and exclusive property of the Company, and the Executive shall surrender them to the Company at any time upon request by the Company.

6.3. Change of Control Agreement. The Executive acknowledges that she is bound by, and benefits from, the Change of Control Severance Agreement between the Executive and the Company dated as of March 1, 2017, effective as of November 6, 2019 (such agreement and any similar successor agreement, referred to herein as the “Change of Control Agreement”). The Company agrees that to the extent Executive’s employment terminates (before or after a Retirement, and including on the expiration of the term of an Advisory Agreement as described in Paragraph 7.4.6) at a time when there is either a Potential Change of Control or within 24 months following a Change of Control (as such terms are defined in the Change of Control Agreement), the Executive will be entitled to the severance benefits described in the Change of Control Agreement, subject to the terms thereof and of Paragraph 15 hereof; provided, however, that the Company agrees it will not give notice under Section 2 of the Change of Control Agreement not to extend the Term, and that that the covenant in Section 4 of the Change of Control Agreement shall be deemed to be satisfied.

7. **Termination**. Unless earlier terminated in accordance with the following provisions of this Paragraph 7, the Company shall continue to employ the Executive and the Executive shall remain employed by the Company during the entire Term as set forth in Paragraph 1.2. Paragraph 8 hereof sets forth certain obligations of the Company in the event that the Executive’s employment hereunder is terminated or Executive has a “Retirement” as defined in Paragraph 7.4.6. Certain capitalized terms used in this Paragraph 7 and Paragraph 8 hereof are defined in Paragraph 7.4 below.

7.1. Death or Disability. Except to the extent otherwise expressly stated herein, including without limitation, as provided in Paragraph 8.1 with respect to certain post-Date of Termination payment obligations of the Company, this Agreement shall terminate immediately on the Date of Termination in the event of the Executive’s death or in the event of Executive’s disability. For purposes of this Agreement, “Disability” shall mean the absence of the Executive from the Executive’s duties with the Company on a full-time basis for 180 consecutive business days as a result of incapacity due to mental or physical illness or injury which is determined to be total and permanent by a physician selected by the Company or its insurers and reasonably acceptable to the Executive or the Executive’s legal representative. In the event of disability, until the Date of Termination the base salary payable to the Executive under Paragraph 3 hereof shall be reduced dollar-for-dollar by the amount of disability benefits, if any, paid to the Executive in accordance with any disability policy or program of the Company.

7.2. Notification of Discharge by the Company or Resignation for Good Reason. In accordance with the procedures hereinafter set forth, the Company may discharge the Executive from her employment hereunder with or without Cause and the Executive may resign from her employment hereunder for Good Reason or otherwise. Any discharge of the Executive by the Company or resignation by the Executive for Good Reason shall be communicated by a Notice of Termination to the Executive (in the case of discharge) or to the Company (in the case of the Executive's resignation) given in accordance with Paragraph 10 of this Agreement. For purposes of this Agreement, a "Notice of Termination" means a written notice which:

(i) indicates the specific termination provision in this Agreement relied upon,

(ii) sets forth in reasonable detail the facts and circumstances providing a basis for termination of the Executive's employment under the provision so indicated and

(iii) if the Date of Termination is to be other than the date of receipt of such notice, specifies the termination date (which date shall in all events be within fifteen (15) days after the giving of such notice).

No purported termination of the Executive's employment for Cause shall be effective without a Notice of Termination to the Executive. The failure by the Executive to set forth in any Notice of Termination to the Company any facts or circumstances which contributes to a showing of Good Reason shall not waive any right of the Executive hereunder or preclude the Executive from asserting such fact or circumstances in enforcing the Executive's rights hereunder.

7.3. Termination on or After a Mutually Agreed Retirement. The Company and the Executive may mutually agree on the termination of the Executive's employment on or after a Retirement (as defined in Paragraph 7.4.6 below).

7.4. Definitions. For purposes of this Paragraph 7 and Paragraph 8 hereof, the following capitalized terms shall have the meanings set forth below:

7.4.1. "Accrued Obligations" shall mean, as of the Date of Termination, the sum of (A) the Executive's base salary under Paragraph 3 through the Date of Termination to the extent not theretofore paid, (B) the amount of any bonus, incentive compensation, deferred compensation and other cash compensation accrued by the Executive as of the Date of Termination to the extent not theretofore paid and (C) any vacation pay, expense reimbursements and other cash entitlements accrued by the Executive as of the Date of Termination to the extent not theretofore paid.

7.4.2. "Cause" shall mean (A) the willful and continued failure of the Executive to perform substantially the Executive's duties with the Company or one of its affiliates (other than any such failure resulting from disability), after a written demand for substantial performance is delivered to the Executive by the Board of Directors which specifically identifies the manner in which the Board believes that the Executive has not substantially performed the Executive's duties, or (B) the willful engaging by the Executive in illegal conduct or gross misconduct which is injurious to the Company. For purposes of this provision, no act or failure to act on the part of the Executive shall be considered "willful" unless it is done, or omitted to be done, by the Executive in bad faith or without reasonable belief that the Executive's action or omission was in the best interests of the Company. Any act or failure to act based upon authority given pursuant to a resolution duly adopted by the Board or based on the advice of a senior officer of the Company or counsel for the Company shall be conclusively presumed to be done, or omitted to be done, by the Executive in good faith and in the best interests of the Company. The cessation of employment of the Executive shall not be deemed to be for Cause unless and until there shall have been delivered to the Executive a copy of a resolution duly adopted by the affirmative vote of not less than two-thirds of the entire membership of the Board at a meeting of the Board called and held for such purpose (after reasonable notice is provided to the Executive and the Executive is given an opportunity, together with counsel, to be heard before the Board), finding that, in the good faith opinion of the Board, the Executive is guilty of the conduct described in subparagraph (A) or (B) above of this Paragraph 7.4.2, and specifying the particulars thereof in detail.

7.4.3. "Date of Termination" shall mean (A) in the event of a discharge of the Executive by the Company for Cause or a resignation by the Executive for Good Reason, the date the Executive (in the case of such discharge) or the Company (in the case of such resignation) receives a Notice of Termination, or any later permitted date specified in such Notice of Termination, as the case may be, (B) on the date of a mutually agreed termination of employment on or following a Retirement (as defined in Section 7.4.6), (C) in the event of a discharge of the Executive without Cause or a resignation by the Executive without Good Reason (other than on Retirement), the date the Executive (in the case of discharge) or the Company (in the case of resignation) receives notice of such termination of employment other than in the case of a Retirement, (D) in the event of the Executive's death, the date of the Executive's death, and (E) in the event of termination of the Executive's employment by reason of disability pursuant to Paragraph 7.1, the date the Executive receives written notice of such termination.

7.4.4. "Good Reason" shall mean, subject to the notice and cure requirements below, a voluntary termination by the Executive within one year following the initial existence of one or more of the following conditions, without the consent of the Executive:

(a) Material diminution of base compensation;

(b) Material diminution of the Executive's authority, duties or responsibilities;

(c) Material change in the geographic location in which the Executive provides services; and

(d) Any other action or inaction by the Company that constitutes a material breach of the terms of this Agreement.

The Executive must provide notice to the Company of the existence of the good reason condition not later than 90 days of its initial existence. The Company shall have a period of 60 days to cure the condition giving rise to such notice. In the event the Company cures or corrects the specific Good Reason condition within the time period specified above, Good Reason termination shall not be deemed to exist with respect to the specific condition set forth in the Notice of Termination.

7.4.5. "Monthly Bonus Amount" shall mean the quotient of (A) the "bonus percentage" (as hereinafter defined) times the Executive's annual base salary as in effect under Paragraph 3 on the Date of Termination, divided by (B) twelve (12). The term "bonus percentage" shall mean the percentage of the Executive's base salary that the Executive received as a bonus with respect to the fiscal year immediately preceding the fiscal year in which the Date of Termination occurs, but in no event less than 25%.

7.4.6. "Retirement" shall mean a termination of full time service as Chief Executive Officer after the Executive's 65th birthday (whether or not the Executive's employment terminates at that time), as mutually agreed by the Executive and the Company, provided that the Executive, to the extent requested by Company, agrees to provide transition advisory services (as a part time employee or as a consultant) to the new Chief Executive Officer and Board of Directors for a period of up to 12 months following the date of Retirement at a rate of up to 5 hours per week (the "Advisory Agreement"), which will include an agreement by the Executive, during the term of the Advisory Agreement and for a period of one (1) year thereafter, not to organize or serve in any capacity (whether as an officer, director, employee, consultant or otherwise) any person, firm, corporation or other entity which is in direct competition with the Company or which may otherwise give rise to a conflict of interest or appearance of a conflict of interest with Executive's service to the Company, without the prior written consent of the Company.

To document a mutually agreeable Retirement, the Executive shall provide a Retirement Resignation to the Company given in accordance with Paragraph 10 of this Agreement. For purposes of this Agreement, a "Retirement Resignation" means a written notice which reflects the Executive's resignation from her seat on the Board of Directors and offices with the Company and its subsidiaries, effective upon a date that is mutually agreeable with the Board of Directors. For the avoidance of doubt, in the event that the Company and Executive cannot agree to a Retirement date, Executive maintains all rights under this Agreement, under the Executive Equity Retirement Program, and to otherwise to provide notice of her retirement.

8. **Obligations of the Company Upon Termination**.

8.1. Discharge for Cause, Resignation Without Good Reason (except on Retirement), Death or Disability. During the Term of this Agreement, in the event of a discharge of the Executive for Cause or resignation by the Executive without Good Reason (except on Retirement), or in the event this Agreement terminates pursuant to Paragraph 7.1 by reason of the death or disability of the Executive:

(a) the Company shall pay all Accrued Obligations to the Executive, or to her beneficiaries, heirs or estate in the event of the Executive's death, in a lump sum in cash within thirty (30) days after the Date of Termination; and

(b) the Executive, or her beneficiaries, heirs or estate in the event of the Executive's death, shall be entitled to receive all benefits accrued by her as of the Date of Termination under all qualified and nonqualified retirement, pension, profit sharing and similar plans of the Company in such manner and at such time as are provided under the terms of such plans and arrangements; and

(c) except as otherwise provided in Paragraph 15 hereof, all other obligations of the Company under this Agreement shall cease forthwith.

8.2. Discharge Without Cause or Resignation for Good Reason. During the Term of this Agreement and/or during the Term of the Advisory Agreement (if Executive remains an employee under said Advisory Agreement), if the Executive is discharged other than for (x) Cause (i.e., without Cause) or (y) disability, or if the Executive resigns with Good Reason:

(a) the Company shall pay to the Executive in a lump sum in cash within thirty (30) days after the Date of Termination the aggregate of the following amounts:

i. all Accrued Obligations; and

ii. an amount equal to her monthly base salary at the highest rate in effect in the most recent year multiplied by 24; and

iii. an amount equal to the Monthly Bonus Amount multiplied by 24.

(b) If Executive elects to continue health coverage under the Company's health plan in accordance with the continuation requirements of COBRA, the Company will pay for the cost of such coverage until the earlier of (i) the date Executive begins full-time employment or full-time self-employment; or (ii) the end of the eighteenth month after the Date of Termination; and

(c) the Executive shall be entitled to receive all benefits accrued by her as of the Date of Termination under all qualified and nonqualified retirement, pension, profit sharing and similar plans of the Company in such manner and at such time as are provided under the terms of such plans; and

(d) all stock options and other stock interests or stock-based rights awarded to the Executive by the Company on or before the Date of Termination shall become fully vested and nonforfeitable as of the Date of Termination and shall remain in effect and exercisable in accordance with the terms and conditions of their grant; and

(e) except as otherwise provided in Paragraph 15 hereof, all other obligations of the Company under this Agreement shall cease forthwith.

8.3. Retirement. In the event of a Retirement (whether or not accompanied by a termination of employment):

(a) the Company shall pay all Accrued Obligations to the Executive, in a lump sum in cash within thirty (30) days after the Date of Termination on or following the Retirement; and

(b) the Company will continue to pay the Executive an amount equal to her base pay in effect on the date of Retirement, for 12 months following the date of Retirement, on a payroll continuation basis; and

(c) Notwithstanding Executive's Retirement and/or termination of employment, the Executive will continue to have a target opportunity under the Axcelis Management Incentive plan (or any equivalent successor annual cash incentive plan in which the executive officers participate) for the year in which the date of Retirement occurs, equal to 100% of her annual base salary at the date of Retirement (but not less than the amount set forth in Paragraph 3), and be entitled to a payout under such plan, based on the score as determined in accordance with the plan, and paid as and when other plan payouts are made regardless of whether Executive remains employed on that date; and

(d) In the event the Executive's employment continues after the year in which the date of Retirement occurs, the Executive will continue to have a target opportunity under the Axcelis Management Incentive plan (or any equivalent successor annual cash incentive plan in which the executive officers participate) for any year in which her employment continues equal to 100% of her actual base salary received during the applicable year, and be entitled to a payout under such plan, based on the score as determined in accordance with the plan, and paid as and when other plan payouts are made regardless of whether Executive remains employed on that date; and

(e) Except as provided in Section 5.2.2 (which is governed by the terms therein), the Executive shall be entitled to the acceleration of unvested equity awards at the date of Retirement in accordance with the Executive Equity Retirement Program adopted by the Compensation Committee of the Board of Directors as if the Executive had given notice of Retirement on December 31, 2022, and without regard to whether the date of Retirement is less than 18 months after such agreement; accordingly, at Retirement:

i. all equity awards made during and prior to 2021 shall be fully vested;

ii. the service based equity award made in 2022 shall be at least 75% vested (and shall be 100% vested on May 16, 2024 in the event the Executive's employment continues through that date), unless a higher percentage of vesting is provided by the Executive Equity Retirement Program;

iii. the first tranche (50% of the number earned) of the 2022 performance based RSUs will be fully vested and the second tranche of 2022 performance based grant shall be at least 75% vested (and shall be 100% vested on February 28, 2024 in the event the Executive's employment continues through that date) unless a higher percentage of vesting is provided in the Executive Equity Retirement Program;

iv. the 2023 performance based RSUs described in Section 5.2.2(a) shall be vested as described in that section; and

v. if the date of Retirement is in 2024, the Executive will receive the service based grant described in Section 5.2.2(b) which will vest as described in that section; and

(f) If Executive elects to continue health coverage under the Company's health plan in accordance with the continuation requirements of COBRA, the Company will pay 100% of the COBRA premium for the cost of such coverage for up to 18 months; and

(g) The Executive shall be entitled to receive all benefits accrued by her as of the Date of Termination under all qualified and nonqualified retirement, pension, deferred compensation, profit sharing and similar plans of the Company in such manner and at such time as are provided under the terms of such plans and arrangements; and

(h) except as otherwise provided in Paragraph 15 hereof, all other obligations of the Company under this Agreement shall cease forthwith.

8.4. Payment Obligations Absolute. The Company's obligation to make the payments and the arrangements provided for herein shall be absolute and unconditional, and shall not be affected by any circumstances, including, without limitation, any offset, counterclaim, recoupment, defense, or other right which the Company may have against the Executive or any other party. Each and every payment made hereunder by the Company shall be final, and the Company shall not seek to recover all or any part of such payment from the Executive or from whomsoever may be entitled thereto, for any reasons whatsoever.

8.5. Section 409A**.** Notwithstanding anything to the contrary in this Agreement, if the Executive is a "specified employee" within the meaning of Section 409A of the Internal Revenue Code of 1986, as amended (the "Code") and the final regulations and any guidance promulgated thereunder ("Section 409A") at the time of Executive's separation from service, and the severance payments and separation benefits payable to Executive, if any, pursuant to this Agreement is considered "nonqualified deferred compensation" as defined pursuant to

Section 409A, such payments and benefits shall be made to Executive with the first payroll that is six months and one day following the Executive's Date of Termination.

8.6. Contractual Rights to Benefits. This Agreement establishes and vests in the Executive a contractual right to the benefits to which she is entitled hereunder. The Executive shall not be obligated to seek other employment in mitigation of the amounts payable or arrangements made under any provision of this Agreement, and the obtaining of any such other employment shall in no event effect any reduction of the Company's obligations to make the payments and arrangements required to be made under this Agreement.

9. **Binding Effect**. This Agreement shall be binding upon and inure to the benefit of the heirs and representatives of the Executive and the successors and assigns of the Company. The Company shall require any successor (whether direct or indirect, by purchase, merger, reorganization, consolidation, acquisition of property or stock, liquidation, or otherwise) to all or a majority of its assets, by agreement in form and substance reasonably satisfactory to the Executive, expressly to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform this Agreement if no such succession had taken place. Regardless whether such agreement is executed, this Agreement shall be binding upon any successor of the Company in accordance with the operation of law and such successor shall be deemed the "Company" for purposes of this Agreement.

10. **Notices**. All notices, requests, demands and other communications hereunder shall be in writing and shall be deemed to have been duly given if delivered by hand or mailed within the continental United States by first class certified mail, return receipt requested, postage prepaid, addressed as follows:

to the Board or the Company, to:

Axcelis Technologies, Inc.
108 Cherry Hill Drive
Beverly, Massachusetts 01915

to the Executive, to:

Mary G. Puma
c/o Axcelis Technologies, Inc.
108 Cherry Hill Drive
Beverly, Massachusetts 01915

Addresses may be changed by written notice sent to the other party at the last recorded address of that party.

11. **No Assignment**. Except as expressly provided in Paragraph 9, this Agreement is not assignable by any party and no payment to be made hereunder shall be subject to anticipation, alienation, sale, transfer, assignment, pledge, encumbrance or other charge.

12. **Execution in Counterparts**. This Agreement will be executed by the parties hereto in two or more counterparts, each of which shall be deemed to be an original, but all such counterparts shall constitute one and the same instrument, and all signatures need not appear on any one counterpart.

13. **Jurisdiction and Governing Law**. Jurisdiction over disputes with regard to this Agreement shall be exclusively in the courts of the Commonwealth of Massachusetts, and this Agreement shall be construed and interpreted in accordance with and governed by the local laws of the Commonwealth of Massachusetts, other than the conflict of laws provisions of such laws.

14. **Severability**. If any provision of this Agreement shall be adjudged by any court of competent jurisdiction to be invalid or unenforceable for any reason, such judgment shall not affect, impair or invalidate the remainder of this Agreement.

15. **Prior Understandings**. This Agreement amends and restates in its entirety the Current Agreement as of the Effective Date and embodies the entire understanding of the parties hereto, and supersedes all other oral or written agreements or understandings between them regarding the subject matter hereof including the Current Agreement, but excluding the Change of Control Severance Agreement dated as of March 1, 2017, and effective as of November 6, 2019, the Indemnification Agreement between the Executive and the Company dated February 28, 2012, and the Executive Equity Retirement Program. In the event of a termination of Executive's employment during a Potential Change of Control or following a Change of Control (as defined in such Change of Control Agreement), the Executive shall be entitled to receive the greater of the amounts and benefits under this Agreement or the Change of Control Agreement but the Executive shall not receive the aggregate of the amounts and benefits under both such agreements. If she is entitled to receive amounts and benefits under both the Change of Control Agreement and this Agreement, the amount and benefits payable, if any, under the Change of Control Agreement shall be deemed to have been paid first and, if the amounts and benefits due under this Agreement are greater than those actually paid under the Change of Control Agreement, such excess shall be paid under this Agreement. Nothing in this Agreement is intended as and shall not be read as a modification of the Change of Control Agreement, the Indemnification Agreement or any outstanding equity award agreement, and such agreements shall be and remain in full force and effect in accordance with their respective terms. No change, alteration or modification hereof may be made except in a writing, signed by each of the parties hereto. The headings in this Agreement are for convenience of reference only and shall not be construed as part of this Agreement or to limit or otherwise affect the meaning hereof.

IN WITNESS WHEREOF, the parties hereto have executed and delivered this Agreement as of the Effective Date.

AXCELIS TECHNOLOGIES, INC.

By: /s/ Lynnette C. Fallon__________

Name: Lynnette C. Fallon

Title: Executive Vice President HR/Legal and General Counsel

MARY G. PUMA

/s/ Mary G. Puma________________

CERTIFICATION
of the Principal Executive Officer
Pursuant to Rule 13a-14(a)/15d-14(a) (implementing Section 302 of the Sarbanes-Oxley Act)

I, Mary G. Puma, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Axcelis Technologies, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 4, 2022

/s/ MARY G. PUMA

Mary G. Puma,
President and Chief Executive Officer

Exhibit 31.2

CERTIFICATION
of the Principal Financial Officer
Pursuant to Rule 13a-14(a)/15d-14(a) (implementing Section 302 of the Sarbanes-Oxley Act)

I, Kevin J. Brewer, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Axcelis Technologies, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 4, 2022

/s/ KEVIN J. BREWER

Kevin J. Brewer,
Executive Vice President and Chief Financial Officer

EXHIBIT 32.1

AXCELIS TECHNOLOGIES, INC.
Certification of the Principal Executive Officer
Pursuant to Section 1350 of Chapter 63 of title 18 of the United States Code

The undersigned Chief Executive Officer of Axcelis Technologies, Inc., a Delaware corporation, hereby certifies, for the purposes of Section 1350 of Chapter 63 of title 18 of the United States Code (as implemented by Section 906 of the Sarbanes-Oxley Act of 2002) as follows:

This Form 10-Q quarterly report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m or 78o(d)) and the information contained herein fairly presents, in all material respects, the financial condition and results of operations of the Company.

IN WITNESS WHEREOF, the undersigned has executed this Certification as of August 4, 2022.

/s/ MARY G. PUMA

Mary G. Puma
President and Chief Executive Officer of Axcelis Technologies, Inc.

EXHIBIT 32.2

AXCELIS TECHNOLOGIES, INC.
Certification of the Principal Financial Officer
Pursuant to Section 1350 of Chapter 63 of title 18 of the United States Code

The undersigned Chief Financial Officer of Axcelis Technologies, Inc., a Delaware corporation, hereby certifies, for the purposes of Section 1350 of Chapter 63 of title 18 of the United States Code (as implemented by Section 906 of the Sarbanes-Oxley Act of 2002) as follows:

This Form 10-Q quarterly report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m or 78o(d)) and the information contained herein fairly presents, in all material respects, the financial condition and results of operations of the Company.

IN WITNESS WHEREOF, the undersigned has executed this Certification as of August 4, 2022.

/s/ KEVIN J. BREWER

Kevin J. Brewer
Executive Vice President and Chief Financial Officer of
Axcelis Technologies, Inc.