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 March 31, 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 May 2, 2022, there were 33,020,420 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 March 31,	
	2022	2021
Revenue:		
Product	$ 196,531	$ 126,609
Services	7,064	6,167
Total revenue	203,595	132,776
Cost of revenue:		
Product	107,642	70,334
Services	6,187	6,007
Total cost of revenue	113,829	76,341
Gross profit	89,766	56,435
Operating expenses:		
Research and development	16,973	15,685
Sales and marketing	11,291	10,387
General and administrative	12,579	10,013
Total operating expenses	40,843	36,085
Income from operations	48,923	20,350
Other (expense) income:		
Interest income	95	33
Interest expense	(1,518)	(1,029)
Other, net	(1,617)	(1,153)
Total other expense	(3,040)	(2,149)
Income before income taxes	45,883	18,201
Income tax provision	4,269	1,721
Net income	$ 41,614	$ 16,480
Net income per share:		
Basic	$ 1.25	$ 0.49
Diluted	$ 1.22	$ 0.48
Shares used in computing net income per share:		
Basic weighted average common shares	33,245	33,715
Diluted weighted average common shares	33,974	34,643

See accompanying Notes to these Consolidated Financial Statements (Unaudited)

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

	Three months ended March 31,	
	2022	**2021**
Net income	$ 41,614	$ 16,480
Other comprehensive loss:		
Foreign currency translation adjustments	(1,186)	(1,372)
Amortization of actuarial gain and other adjustments from pension plan, net of tax	9	20
Total other comprehensive loss	(1,177)	(1,352)
Comprehensive income	$ 40,437	$ 15,128

See accompanying Notes to these Consolidated Financial Statements (Unaudited)

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

	March 31, 2022	December 31, 2021
ASSETS		
Current assets:		
Cash and cash equivalents	$ 297,141	$ 294,923
Accounts receivable, net	118,987	104,410
Inventories, net	203,838	194,984
Prepaid expenses and other current assets	28,740	24,929
Total current assets	648,706	619,246
Property, plant and equipment, net	35,500	34,972
Operating lease assets	9,403	9,242
Finance lease assets, net	18,914	19,238
Long-term restricted cash	755	757
Deferred income taxes	36,226	35,454
Other assets	32,692	34,331
Total assets	$ 782,196	$ 753,240
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 50,759	$ 38,025
Accrued compensation	10,538	30,732
Warranty	7,203	6,424
Income taxes	1,734	887
Deferred revenue	60,477	60,454
Current portion of finance lease obligation	1,039	979
Other current liabilities	15,747	12,639
Total current liabilities	147,497	150,140
Long-term finance lease obligation	46,128	46,415
Long-term deferred revenue	14,363	7,982
Other long-term liabilities	14,935	9,744
Total liabilities	222,923	214,281
Commitments and contingencies (Note 16)		
Stockholders' equity:		
Common stock, $0.001 par value, 75,000 shares authorized; 33,064 shares issued and outstanding at March 31, 2022; 33,240 shares issued and outstanding at December 31, 2021	33	33
Additional paid-in capital	554,633	559,883
Retained earnings (accumulated deficit)	4,019	(22,722)
Accumulated other comprehensive income	588	1,765
Total stockholders' equity	559,273	538,959
Total liabilities and stockholders' equity	$ 782,196	$ 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

	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

See accompanying Notes to these Consolidated Financial Statements (Unaudited)

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

	Three months ended March 31, 2022	Three months ended March 31, 2021
Cash flows from operating activities		
Net income	$ 41,614	$ 16,480
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	2,848	2,645
Deferred income taxes	2,252	1,613
Stock-based compensation expense	2,701	2,407
Provision for excess and obsolete inventory	1,027	984
Changes in operating assets and liabilities:		
Accounts receivable	(15,199)	10,431
Inventories	(11,490)	(16,503)
Prepaid expenses and other current assets	(1,852)	(3,325)
Accounts payable and other current liabilities	(3,582)	(1,008)
Deferred revenue	6,418	(909)
Income taxes	858	2
Other assets and liabilities	175	2,281
Net cash provided by operating activities	25,770	15,098
Cash flows from investing activities		
Expenditures for property, plant and equipment and capitalized software	(1,503)	(1,347)
Net cash used in investing activities	(1,503)	(1,347)
Cash flows from financing activities		
Net settlement on restricted stock grants	(3,315)	(2,354)
Repurchase of common stock	(20,000)	(11,635)
Principal payments on finance lease obligation	(229)	(175)
Proceeds from exercise of stock options	491	2,512
Net cash used in financing activities	(23,053)	(11,652)
Effect of exchange rate changes on cash and cash equivalents	1,002	1,188
Net increase in cash, cash equivalents and restricted cash	2,216	3,287
Cash, cash equivalents and restricted cash at beginning of period	295,680	204,232
Cash, cash equivalents and restricted cash at end of period	$ 297,896	$ 207,519

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 $2.7 million and $2.4 million for the three-month periods ended March 31, 2022 and 2021, respectively. These amounts include compensation expense related to RSUs and non-qualified stock options.

In the three-month periods ended March 31, 2022 and 2021, we issued 0.1 million and 0.3 million shares of common stock, respectively, upon stock option exercises and vesting of RSUs. In the three-month periods ended March 31, 2022 and 2021, we received proceeds of $0.5 million and $2.5 million, respectively, in connection with the exercise of stock options.

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	March 31, 2022	December 31, 2021
Assets		(in thousands)	
Operating leases	Operating lease assets	$ 9,403	$ 9,242
Finance lease	Finance lease assets *	18,914	19,238
Total leased assets		$ 28,317	$ 28,480
Liabilities			
Current			
Operating	Other current liabilities	$ 5,106	$ 4,716
Finance	Current portion of finance lease obligation	1,039	979
Noncurrent			
Operating	Other long-term liabilities	4,170	4,357
Finance	Finance lease obligation	46,128	46,415
Total lease liabilities		$ 56,443	$ 56,467

*Finance lease assets are recorded net of accumulated depreciation of $48.9 million and includes $0.6 million of prepaid financing costs as of March 31, 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 months ended March 31, 2022 and 2021 as follows:

Lease cost	Classification	Three months ended March 31, 2022	2021
Operating lease cost		(in thousands)	
Product / Services	Cost of revenue	$ 1,210	$ 639
Research and development	Operating expenses	56	130
Sales and marketing*	Operating expenses	418	378
General and administrative*	Operating expenses	211	260
Total operating lease cost		$ 1,895	$ 1,407
Finance lease cost			
Depreciation of leased assets	Cost of revenue, R&D, Sales and marketing and G&A	$ 324	$ 328
Interest on lease liabilities	Interest expense	1,258	1,279
Total finance lease cost		$ 1,582	$ 1,607
Total lease cost		$ 3,477	$ 3,014

* Sales and marketing and general and administrative expense also includes short-term lease and variable lease costs of approximately $0.5 million and $0.4 million for the three months ended March 31, 2022 and 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 March 31, 2022:

Maturity of Lease Liabilities	Finance Leases	Operating Leases (in thousands)	Total Leases
2022	$ 4,493	$ 4,075	$ 8,568
2023	6,114	3,188	9,302
2024	6,252	1,032	7,284
2025	5,930	718	6,648
2026	6,008	482	6,490
Thereafter	67,715	78	67,793
Total lease payments	$ 96,512	$ 9,573	$ 106,085
Less interest portion*	(49,345)	(297)	(49,642)
Finance lease and operating lease obligations	$ 47,167	$ 9,276	$ 56,443

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

Lease term and discount rate	March 31, 2022
Weighted-average remaining lease term (years):	
Operating leases	2.6
Finance leases	14.8
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 payment of 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 three months ending March 31, 2022 and 2021, respectively:

Cash paid for amounts included in the measurement of lease liabilities	Three months ended March 31, 2022	2021
	(in thousands)	
Operating cash outflows from operating leases	$ 1,896	$ 1,407
Operating cash outflows from finance leases	1,258	1,279
Financing cash outflows from finance leases	229	175
Operating lease assets obtained in exchange for operating lease liabilities	1,638	791
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 March 31, 2022	2021
	(in thousands)	
Systems	$ 151,801	$ 80,991
Aftermarket	51,794	51,785
Total Revenue	$ 203,595	$ 132,776

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 March 31,	
	2022	2021
	(in thousands)	
North America	$ 24,913	$ 9,508
Asia Pacific	149,240	103,391
Europe	29,442	19,877
Total Revenue	$ 203,595	$ 132,776

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:

	March 31, 2022	December 31, 2021
	(in thousands)	
Contract liabilities	$ 74,840	$ 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 March 31,	
	2022	2021
	(in thousands)	
Balance, beginning of the period	$ 68,436	$ 23,058
Deferral of revenue	23,394	11,264
Recognition of deferred revenue	(16,990)	(12,180)
Balance, end of the period	$ 74,840	$ 22,142

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 months ended March 31, 2022 and 2021, respectively:

	Three months ended March 31,	
	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 March 31,	
	2022	2021
	(in thousands, except per share amounts)	
Net income available to common stockholders	$ 41,614	$ 16,480
Weighted average common shares outstanding used in computing basic income per share	33,245	33,715
Incremental options and RSUs	729	928
Weighted average common shares used in computing diluted net income per share	33,974	34,643
Net income per share		
Basic	$ 1.25	$ 0.49
Diluted	$ 1.22	$ 0.48

Diluted weighted average common shares outstanding does not include 4,706 and 1,429 common equivalent shares issuable with respect to outstanding equity awards for the three-month periods ended March 31, 2022 and 2021, respectively, as their effect would have been anti-dilutive.

Note 7. Accumulated Other Comprehensive Income

The following table presents the changes in accumulated other comprehensive income, net of tax, by component, for the three months ended March 31, 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	(1,186)	9	(1,177)
Balance at March 31, 2022	$ 878	$ (290)	$ 588

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:

	March 31, 2022	December 31, 2021
	(in thousands)	
Cash and cash equivalents	$ 297,141	$ 294,923
Long-term restricted cash	755	757
Total cash, cash equivalents and restricted cash	$ 297,896	$ 295,680

As of March 31, 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:

	March 31, 2022	December 31, 2021
	(in thousands)	
Raw materials	$ 140,138	$ 133,784
Work in process	45,537	43,164
Finished goods (completed systems)	18,163	18,036
Inventories, net	$ 203,838	$ 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:

	Three months ended March 31, 2022	2021
	(in thousands)	
Balance at January 1 (beginning of year)	$ 6,924	$ 4,612
Warranties issued during the period	2,140	1,288
Settlements made during the period	(1,430)	(968)
Changes in estimate of liability for pre-existing warranties during the period	375	(192)
Balance at March 31 (end of period)	$ 8,009	$ 4,740
Amount classified as current	$ 7,203	$ 4,181
Amount classified as long-term	806	559
Total warranty liability	$ 8,009	$ 4,740

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:

	March 31, 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	$ 264,892	$ —	$ —	$ 264,892

	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 $47.2 million as of March 31, 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 March 31, 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 $4.3 million for the three months ended March 31, 2022, compared to $1.7 million for the three months ended March 31, 2021. The $2.6 million increase was primarily due to a $27.7 million increase in pretax income. During the three months ended March 31, 2022, an international tax audit commenced, and we have determined that it is not more likely than not that certain tax positions being examined by the tax authorities will be sustained.

Therefore, we have recorded a liability of $0.7 million related to our estimated exposure as of March 31, 2022. We will assess this tax reserve in subsequent quarters until final settlement.

The effective tax rate for the three months ended March 31, 2022 was less than the U.S. statutory rate of 21% due to forecasted Foreign Derived Intangible Income (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 months ended March 31, 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 $36.2 million and $35.5 million as of March 31, 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 $8.6 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 March 31, 2022, two customers accounted for 15.0% and 11.1% of total revenue, respectively. For the three months ended March 31, 2021, one customer accounted for 29.6% of total revenue.

At March 31, 2022, three customers accounted for 19.1%, 16.6% and 10.3% 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 March 2022, we purchased 0.3 million shares at an average cost of $70.41 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 69.8% of total revenue for the three months ended March 31, 2022.

For Axcelis and the rest of our industry, the first quarter 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 quarter. Axcelis' strong results in the first three 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 81% of first quarter shipments going to mature foundry/logic customers.

In December 2020, the United States Commerce Department placed one of our major Chinese customers, Semiconductor Manufacturing International Corporation ("SMIC"), on the U.S. export controls Entity List. As a result of the Entity List classification, we are required to obtain export controls licenses for all U.S. shipments to this customer. Although we have received licenses as needed, export controls remain an evolving topic for the U.S. government and changes in this area could create delays in future shipments.

Despite the many difficult logistical challenges brought on by trade tensions between the United States and China and COVID-19, we are continuing to work closely with our customers across market segments to provide them with the best ion implant solutions for their specific manufacturing challenges.

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 March 31,	
	2022	2021
Revenue:		
Product	96.5 %	95.4 %
Services	3.5	4.6
Total revenue	100.0	100.0
Cost of revenue:		
Product	52.9	53.0
Services	3.0	4.5
Total cost of revenue	55.9	57.5
Gross profit	44.1	42.5
Operating expenses:		
Research and development	8.3	11.8
Sales and marketing	5.5	7.8
General and administrative	6.2	7.5
Total operating expenses	20.0	27.1
Income from operations	24.1	15.4
Other (expense) income:		
Interest income	—	—
Interest expense	(0.7)	(0.8)
Other, net	(0.8)	(0.9)
Total other expense	(1.5)	(1.7)
Income before income taxes	22.6	13.7
Income tax provision	2.1	1.3
Net income	20.5 %	12.4 %

Revenue

The following table sets forth our product and services revenue:

	Three months ended March 31,		Period-to-Period Change	
	2022	2021	$	%
	(dollars in thousands)			
Revenue:				
Product	$ 196,531	$ 126,609	$ 69,922	*55.2 %*
Percentage of revenue	*96.5 %*	*95.4 %*		
Services	7,064	6,167	897	*14.5 %*
Percentage of revenue	*3.5 %*	*4.6 %*		
Total revenue	$ 203,595	$ 132,776	$ 70,819	*53.3 %*

Product

Product revenue, which includes systems sales, sales of spare parts, product upgrades and used systems was $196.5 million, or 96.5% of revenue during the three months ended March 31, 2022, compared with $126.6 million, or

95.4% of revenue for the three months ended March 31, 2021. The $69.9 million increase in product revenue for the three-month period ending March 31, 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 March 31, 2022 and December 31, 2021 was $74.8 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 $7.1 million, or 3.5% of revenue for the three months ended March 31, 2022, compared with $6.2 million, or 4.6% of revenue for the three months ended March 31, 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.

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

Included in total revenue of $203.6 million during the three months ended March 31, 2022 is revenue from our Aftermarket business of $51.8 million, consistent with $51.8 million of aftermarket revenue for the three months ended March 31, 2021. The remaining $151.8 million of revenue for the three months ended March 31, 2022 was from system sales. 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.

Gross Profit / Gross Margin

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

	Three months ended March 31,		Period-to-Period Change	
	2022	2021	$	%
	(dollars in thousands)			
Gross Profit:				
Product	$ 88,889	$ 56,275	$ 32,614	*58.0 %*
Product gross margin	*45.2 %*	*44.4 %*		
Services	877	160	717	*448.1 %*
Services gross margin	*12.4 %*	*2.6 %*		
Total gross profit	$ 89,766	$ 56,435	$ 33,331	*59.1 %*
Gross margin	*44.1 %*	*42.5 %*		

Product

Gross margin from product revenue was 45.2% for the three months ended March 31, 2022, compared to 44.4% for the three months ended March 31, 2021. The increase in gross margin resulted from improved margins on Purion systems.

Services

Gross margin from services revenue was 12.4% for the three months ended March 31, 2022, compared to 2.6% for the three months ended March 31, 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 March 31,		Period-to-Period Change	
	2022	2021	$	%
	(dollars in thousands)			
Research and development	$ 16,973	$ 15,685	$ 1,288	*8.2 %*
Percentage of revenue	*8.3 %*	*11.8 %*		
Sales and marketing	11,291	10,387	904	*8.7 %*
Percentage of revenue	*5.5 %*	*7.8 %*		
General and administrative	12,579	10,013	2,566	*25.6 %*
Percentage of revenue	*6.2 %*	*7.5 %*		
Total operating expenses	$ 40,843	$ 36,085	$ 4,758	*13.2 %*
Percentage of revenue	*20.0 %*	*27.1 %*		

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 $24.2 million or 59.2% of our total operating expenses for the three months ended March 31, 2022, compared to $22.0 million or 61.1% of our total operating expenses for the three months ended March 31, 2021. The higher personnel costs for the three months ended March 31, 2022 is 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 March 31,		Period-to-Period Change	
	2022	2021	$	%
	(dollars in thousands)			
Research and development	$ 16,973	$ 15,685	$ 1,288	*8.2 %*
Percentage of revenue	*8.3 %*	*11.8 %*		

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.

Research and development expense was $17.0 million during the three months ended March 31, 2022, an increase of $1.3 million, or 8.2%, compared with $15.7 million during the three months ended March 31, 2021. The increase is primarily due to higher personnel expenses including an increase in incentive-based pay expense.

Sales and Marketing

	Three months ended March 31,		Period-to-Period Change	
	2022	2021	$	%
	(dollars in thousands)			
Sales and marketing	$ 11,291	$ 10,387	$ 904	*8.7 %*
Percentage of revenue	*5.5 %*	*7.8 %*		

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

Sales and marketing expense was $11.3 million during the three months ended March 31, 2022, an increase of $0.9 million, or 8.7%, compared with $10.4 million during the three months ended March 31, 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 March 31,		Period-to-Period Change	
	2022	2021	$	%
	(dollars in thousands)			
General and administrative	$ 12,579	$ 10,013	$ 2,566	*25.6 %*
Percentage of revenue	*6.2 %*	*7.5 %*		

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

General and administrative expense was $12.6 million during the three months ended March 31, 2022, an increase of $2.6 million, or 25.6%, compared with $10.0 million during the three months ended March 31, 2021. The increase is primarily due to an increase personnel expenses and professional fees.

Other (Expense) Income

	Three months ended March 31,		Period-to-period change	
	2022	2021	$	%
	(dollars in thousands)			
Other expense	$ (3,040)	$ (2,149)	$ (891)	*41.5* %
Percentage of revenue	*(1.5)%*	*(1.7)%*		

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 $3.0 million for the three months ended March 31, 2022, compared with $2.1 million for the three months ended March 31, 2021. The increase in other expense was primarily due to an increase in foreign currency exchange losses.

During the three-month periods ended March 31, 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 March 31,		Period-to-period change	
	2022	2021	$	%
	(dollars in thousands)			
Income tax provision	$ 4,269	$ 1,721	$ 2,548	*148.1* %
Percentage of revenue	2.1 %	1.3 %		

Income tax expense was $4.3 million for the three months ended March 31, 2022, compared to $1.7 million for the three months ended March 31, 2021. The $2.6 million increase was primarily due to a $27.7 million increase in pretax income. During the three months ended March 31, 2022, an international tax audit commenced, and we have determined that it is not more likely than not that certain tax positions being examined by the tax authorities will be sustained. Therefore, we have recorded a liability of $0.7 million related to our estimated exposure as of March 31, 2022. We will assess this tax reserve in subsequent quarters until final settlement.

The effective tax rate for the three months ended March 31, 2022 was less than the U.S. statutory rate of 21% due to forecasted Foreign Derived Intangible Income (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 months ended March 31, 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 $36.2 million and $35.5 million as of March 31, 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 $8.6 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 $297.1 million in unrestricted cash and cash equivalents at March 31, 2022, in addition to $0.8 million in restricted cash. Management believes that maintaining a strong cash balance is necessary to provide funding for 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 three months ended March 31, 2022 and 2021, we generated $25.8 million and $15.1 million, respectively, of cash related to operating activities.

Investing activities for the three months ended March 31, 2022 and 2021 resulted in cash outflows of $1.5 million and $1.3 million, respectively, used for capital expenditures.

Financing activities for the three months ended March 31, 2022 resulted in a cash usage of $23.1 million. During the first three months of 2022, $20.0 million in cash was used to repurchase our common stock and $3.3 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 $0.2 million relating to the reduction of the liability under the finance lease of our corporate headquarters. These amounts were partially offset by $0.5 million of proceeds from the exercise of stock options during the first three months of 2022. In comparison, financing activities for the three months ended March 31, 2021 resulted in cash usage of $11.7 million, $11.6 million of which related to the repurchase of our common stock and $2.4 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 $0.2 million relating to the reduction of our financing lease liability. These amounts were partially offset by $2.5 million of proceeds related to the exercise of stock options during the first three 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 March 31, 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 March 31, 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 March 31, 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 March 31, 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 March 31, 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 covering 2022 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 March 31, 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)			
January 1, 2022 through January 31, 2022	—	N/A	—	$ 100,000
February 1, 2022 through February 28, 2022	—	N/A	—	100,000
March 1, 2022 through March 31, 2022	284	$70.41	284	80,000
Total	284		284	

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 13, 2014. Incorporated by reference to Exhibit 3.2 of the Company's Form 8-K filed with the Commission on May 19, 2014.
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 May 5, 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 May 5, 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 May 5, 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 May 5, 2022. Filed herewith.
101	The following materials from the Company's Form 10-Q for the quarter ended March 31, 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: May 5, 2022

By: /s/ KEVIN J. BREWER

Kevin J. Brewer
Executive Vice President and Chief Financial Officer
Duly Authorized Officer and Principal Financial Officer

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: May 5, 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: May 5, 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 May 5, 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 May 5, 2022.

/s/ KEVIN J. BREWER

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