**CLAIMS**

1. A laser-beam power-modulation system, comprising:

(a) an acousto-optic modulator to receive a laser beam and separate the laser beam into a primary beam and a plurality of diffracted beams based on an input signal, wherein a power of the primary beam depends on the input signal;

(b) a slit to transmit the primary beam and dump the plurality of diffracted beams;

(c) a harmonic generator to:

(i) convert a first portion of the primary beam into a converted beam that is a harmonic of the primary beam; and

(ii) transmit a second portion of the primary beam;

(d) a frequency separator to:

(i) receive the converted beam and the second portion of the primary beam;

(ii) transmit the converted beam to an illumination system of a defect inspection tool; and

(iii) dump the second portion of the primary beam;

(e) a first sensor to receive light from the converted beam leaked by the frequency separator and to provide a first feedback indicative of the power of the converted beam;

(f) a controller to generate:

(i) a first control signal based at least in part on the first feedback indicative of the power of the converted beam; and

(ii) a second control signal in response to a signal from the defect inspection tool indicating that a size of a defect on a substrate satisfies a threshold; and

(g) a driver to generate the input signal, based at least in part on the first control signal and the second control signal, wherein the acousto-optic modulator is configured to temporarily decrease the power of the primary beam in response to assertion of the second control signal.

2. The system of claim 1, further comprising:

one or more mirrors to direct the primary beam and the plurality of diffracted beams toward the slit; and

a second sensor to receive light from the primary beam leaked by a respective mirror of the one or more mirrors and to provide a second feedback indicative of the power of the primary beam based on the received light;

wherein the controller is configured to generate the first control signal further based at least in part on the second feedback indicative of the power of the primary beam.

3. The system of claim 2, wherein:

the one or more mirrors comprise a first mirror and a second mirror;

the first mirror is situated between the acousto-optic modulator and the second mirror in a first optical path of the primary beam and a second set of optical paths of the plurality of diffracted beams; and

the second mirror is the respective mirror from which the second sensor is to receive the leaked light from the primary beam.

4. The system of claim 2, further comprising an attenuator situated between the acousto-optic modulator and the one or more mirrors in the first optical path of the primary beam and the second set of optical paths of the plurality of diffracted beams.

5. The system of claim 1, wherein:

the driver is a radio-frequency (RF) driver; and

the input signal is an RF signal.

6. The system of claim 1, wherein the first control signal and the second control signal are each a direct-current (DC) voltage.

7. The system of claim 6, wherein, to generate the first control signal, the controller filters noise from the first feedback.

8. The system of claim 1, further comprising a beam dump, wherein the slit comprises a pair of mirrors to direct the plurality of diffracted beams to the beam dump, the pair of mirrors being separated by a gap to transmit the primary beam.

9. The system of claim 1, wherein the harmonic generator is a fourth harmonic generator.

10. The system of claim 1, further comprising a beam-reducing telescope, situated between the slit and the harmonic generator in the first optical path of the primary beam, to focus the primary beam onto the harmonic generator.

11. The system of claim 1, wherein the primary beam is green, the converted beam is ultraviolet, and the first sensor is an ultraviolet sensor.

12. The system of claim 1, wherein the frequency separator comprises:

a Pellin-Broca prism to separate the converted beam from the second portion of the primary beam;

a first dichroic mirror to reflect the converted beam and transmit at least some of the second portion of the primary beam; and

a second mirror to reflect the converted beam and leak the light from the converted beam to the sensor;

wherein the first dichroic mirror is situated between the Pellin-Broca prism and the second mirror in a third optical path of the converted beam.

13. The system of claim 2, wherein the primary beam is green, the converted beam is ultraviolet, the first sensor is an ultraviolet sensor, and the second sensor is a green sensor.

14. A method, comprising:

(a) separating a laser beam into a primary beam and a plurality of diffracted beams using an acousto-optic modulator, wherein a power of the primary beam depends on an input signal from a driver;

(b) dumping the plurality of diffracted beams while transmitting the primary beam;

(c) converting a first portion of the primary beam into a converted beam that is a harmonic of the primary beam while transmitting a second portion of the primary beam;

(d) separating the converted beam from the second portion of the primary beam using a frequency separator to:

(i) transmit the converted beam to an illumination system of a defect inspection tool; and

(ii) dump the second portion of the primary beam;

(e) generating feedback indicative of the power of the converted beam that leaks through the frequency separator to a first sensor;

(f) generating:

(i) a first control signal based at least in part on a first feedback indicative of the power of the converted beam; and

(ii) a second control signal in response to a signal from the defect inspection tool indicating that a size of a defect on a substrate satisfies a threshold;

(g) providing the first control signal and the second control signal to the driver; and

(h) generating the input signal based at least in part on the first control signal and the second control signal using the driver, wherein the acousto-optic modulator temporarily decreases the power of the primary beam in response to assertion of the second control signal.

15. The method of claim 14, wherein:

dumping the plurality of diffracted beams while transmitting the primary beam comprises using one or more mirrors to direct the primary beam and the plurality of diffracted beams to a slit that transmits the primary beam and dumps the plurality of diffracted beams;

generating the first control signal is performed based at least in part on a second feedback indicative of the power of the primary beam; and

the method further comprises generating the second feedback indicative of the power of the primary beam based on light from the primary beam that leaks through a respective mirror of the one or more mirrors to a second sensor.

16. The method of claim 14, wherein generating the first control signal comprises filtering noise from the first feedback.

17. The method of claim 15, wherein the primary beam is green, the converted beam is ultraviolet, and the first sensor is an ultraviolet sensor, and the second sensor is a green sensor.