What is claimed is:

1. A method of controlling a spectral feature of a pulsed light beam produced by an optical source, the method comprising:

producing, from the optical source, a pulsed light beam at a pulse repetition rate;

directing the pulsed light beam toward a substrate received in a lithography exposure apparatus to expose the substrate to the pulsed light beam;

modifying a pulse repetition rate of the pulsed light beam as it is exposing the substrate;

determining an amount of adjustment to a spectral feature of the pulsed light beam, the adjustment amount compensating for a variation in the spectral feature of the pulsed light beam that correlates to the modification of the pulse repetition rate of the pulsed light beam; and

changing the spectral feature of the pulsed light beam by the determined adjustment amount as the pulsed light beam is exposing the substrate to thereby compensate for the variation in the spectral feature.

2. The method of claim 1, wherein determining the amount of adjustment to the spectral feature comprises:

accessing a correlation recipe, the correlation recipe defining a relationship between the repetition rate and the spectral feature for the optical source;

determining the spectral feature that correlates to the modified pulse repetition rate in the recipe; and

calculating the adjustment amount of the spectral feature that offsets the spectral feature correlated to the modified pulse repetition rate.

3. The method of claim 1, further comprising creating the correlation recipe for the optical source prior to directing the pulsed light beam toward the substrate.

4. The method of claim 2, further comprising creating the correlation recipe for the pulsed optical source in between a pair of bursts of pulses of the pulsed light beam.

5. The method of claim 1, wherein changing the spectral feature of the pulsed light beam comprises adjusting one or more components of the optical source.

6. The method of claim 5, wherein adjusting the one or more components of the optical source comprises adjusting one or more optical components of a spectral feature selection apparatus that interact with the pulsed light beam including rotating a prism of the spectral feature selection apparatus.

7. The method of claim 6, wherein rotating the prism of the spectral feature selection apparatus to thereby change the spectral feature comprises rotating the prism from a first stable equilibrium position to a second stable equilibrium position in a time that is less than or equal to 50 milliseconds.

8. The method of claim 6, wherein rotating the prism of the spectral feature selection apparatus comprises rotating the prism from a first angle to a second angle, wherein the first and second angles can be any angle in a 360° rotation.

9. The method of claim 1, wherein changing the spectral feature of the pulsed light beam comprises changing the spectral feature in between bursts of pulses of the pulsed light beam.

10. The method of claim 1, further comprising receiving an instruction to modify the pulse repetition rate of the pulsed light beam as it is exposing the substrate by a particular value, wherein modifying the pulse repetition rate of the pulsed light beam comprises modifying the repetition rate of the pulsed light beam by the particular value.

11. The method of claim 1, wherein changing the spectral feature of the pulsed light beam by the determined adjustment amount as the pulsed light beam is exposing the substrate to thereby compensate for the spectral feature variation causes the spectral feature of the pulsed light beam to be maintained within a predetermined stable range.

12. The method of claim 11, wherein maintaining the spectral feature in the predetermined stable range also maintains a critical dimension of a feature formed in the substrate to within a predetermined acceptable range.

13. The method of claim 1, wherein the spectral feature is the bandwidth of the pulsed light beam.

14. A system comprising:

an illumination system that produces and directs a pulsed light beam toward a photolithography exposure apparatus, the illumination system including an optical source that produces the pulsed light beam at a pulse repetition rate that is capable of being changed;

a spectral feature selection apparatus configured to select a spectral feature of the pulsed light beam, the spectral feature selection apparatus comprising a set of optical components arranged in the path of the pulsed light beam; and

a control system operatively connected to the optical source and to the spectral feature selection apparatus, the control system configured to:

control the repetition rate at which the pulsed light beam is produced including modifying the repetition rate of the pulsed light beam as it is exposing a substrate in the photolithography exposure apparatus;

determine an amount of adjustment to a spectral feature of the pulsed light beam, the adjustment amount compensating for a variation in the spectral feature of the pulsed light beam that correlates to the modification of the pulse repetition rate of the pulsed light beam; and

send a signal to the spectral feature selection apparatus to move at least one optical component to thereby change the spectral feature of the pulsed light beam by the determined adjustment amount as the pulsed light beam is exposing the substrate to thereby compensate for the spectral feature variation.

15. The system of claim 14, wherein the set of optical components of the spectral feature selection apparatus comprises at least one prism, and the control system is configured to send a signal to a rapid actuator associated with the at least one prism to cause the prism to rotate to thereby change the spectral feature.

16. The system of claim 15, wherein the set of optical components of the spectral feature selection apparatus comprises:

a dispersive optical element arranged to interact with the pulsed light beam, and

a plurality of prisms arranged in the path of the pulsed light beam between the dispersive optical element and the optical source.

17. The system of claim 15, wherein the spectral feature selection apparatus comprises an actuation system comprising at least one actuator associated with a prism and configured to rotate the associated prism to thereby adjust a spectral feature of the pulsed light beam.

18. The system of claim 15, wherein the rapid actuator comprises a rotation stage that rotates about a rotation axis and includes a region that is mechanically linked to the prism.

19. The system of claim 18, wherein the rotation stage is configured to rotate about the rotation axis along a full 360° of angle of rotation.

20. The system of claim 14, wherein the illumination system comprises a beam preparation system configured to receive the pulsed light beam produced from the optical source and to direct the pulsed light beam toward the photolithography exposure apparatus.

21. The system of claim 14, wherein the spectral feature is the bandwidth of the pulsed light beam.