CLAIMS:

1. A method for irradiating semiconductor material comprising:

- selecting a region of a semiconductor material layer surface, the region having a region size;

- irradiating the region of the semiconductor material layer surface with an excimer laser having a beam spot size; and

- adjusting the beam spot size by variably matching the beam spot size to the selected region size by varying the size and shape of a variable aperture;

characterized in that an image of said variable aperture is formed on the semiconductor material layer surface.

2. The method according to claim 1, wherein matching the beam spot size is done by varying the magnification of an optical system with variable image magnification.

3. The method according to claim 1 or 2, further comprising aligning the beam spot in XYZ-direction with the selected region.

4. The method according to anyone of claims 1 to 3, wherein the selected region is at least one full die.

5. The method according to anyone of claims 1 to 4, further comprising homogenizing the laser beam before matching the beam spot size to the selected region size.

6. An apparatus for irradiating semiconductor material comprising:

- an excimer laser for irradiating a selected region of a semiconductor material layer surface, the laser having a laser beam spot size to the selected region having a region size; and

- a means for adjusting the laser beam spot size including means for variably matching the laser beam spot size to the selected region size comprising a variable aperture;

characterized in that the means for variably matching the laser beam spot size further comprise a high-resolution imaging system for forming an image of said variable aperture on the semiconductor material layer surface.

7. The apparatus according to claim 6, wherein the excimer laser is adapted to produce a laser beam with an energy density between 1 and 10 J/cm^2.

8. The apparatus according to claim 6 or 7, wherein the means for matching the laser beam spot size comprises an optical system with variable image magnification.

9. The apparatus according to anyone of claims 6 to 8, further comprising means for aligning the beam spot in XYZ-direction with the selected region.

10. The apparatus according to anyone of claims 6 to 9, wherein the beam spot size matches at least one full die.

11. The apparatus according to anyone of claims 6 to 10, further comprising a beam homogenizer positioned before the means for adjusting the laser beam spot size.

12. Use of an apparatus according to anyone of claims 6 to 11 for making semiconductor material.