

Raith Electron Beam Lithography

The Raith e-LiNE is an electron beam lithography tool with a 100 mm by 100 mm travel range. It uses thermal field emission filament technology and a laser-interferometer controlled stage. The column voltage varies from 100 V to 30 kV and the laser stage moves with a precision of 2 nm. There are six apertures on the system: 7.5, 10, 20, 30, 60, and 120um. The electron beam current is controlled by selecting the appropriate aperture. The system is equipped with a load lock, an automatic height laser sensor, an Inlens detector and a SE2 detector. Typically, large design patterns are divided into small writing fields, which are then stitched together to form the final pattern. The standard writing field size is 100 um square, with 2 nm pixel size, but the writing fields size can vary from 500 nm up to 1 mm square. Within one writing field, the ebeam is deflected to expose one pixel after another sequentially.

System specifications:

- Lithography resolution 100 nm lines and 100 nm spaces
- obtainable Overlay accuracy (alignment) < 80 nm
- Field stitching < 80 nm
- Writing speed 4 MHz
- Beam current drift $\leq 1\%$ / hr (at $\pm 0.5^\circ\text{C}$)
- Beam drift ≤ 5 nm/min (at $\pm 0.5^\circ\text{C}$)

