

Electron Beam Lithography and Nanofabrication

The course will cover both theoretical and practical aspects of electron beam lithography (EBL). Lessons will focus on the principles and fundamentals of the technique, while hands-on experimental sessions will be conducted directly on Raith lithography systems at the CNR-IMM facilities.

EBL is a high-resolution, maskless lithographic technique used to transfer permanent nanoscale patterns onto a substrate. EBL is a high-resolution, maskless lithographic technique used to transfer permanent nanoscale patterns onto a substrate. Typical substrates include SiO_2 , Si, SiC, Ge, GaN, and others.

The course will also introduce layout design and fabrication strategies, taking into account the specific challenges and limitations of various applications. Topics will include: basic concepts of lithography, the structure of the electron beam system (electron gun, column, vacuum system, deflection apparatus), layout definition, multilevel alignment, and more.

In addition, an advanced lithography topic will be addressed, focusing on the proximity effect and electron–material interactions, with the aid of the simulation software "CASINO."

The final evaluation will consist of a discussion on selected topics covered during the course.