Nanotechnology for EUV Lithography, EUV Lithography for Nanotechnology

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The semiconductor industry lies at the core of the AI era, with lithography technology serving as a fundamental driver of its innovation. Although the pace of device scaling has recently slowed, the demand for advanced lithographic technologies continues to grow.

To meet the ever-increasing requirements for extreme miniaturization, extreme ultraviolet (EUV) lithography—operating at a wavelength not naturally available on Earth—has been successfully adopted in high-volume semiconductor manufacturing for more than six years. Currently, the second-generation high-numerical-aperture (high-NA) EUV lithography is approaching production readiness, aiming to replace the first-generation low-NA EUV systems.

The realization of cutting-edge EUV lithography relies on a wide range of enabling nanotechnologies, while, at the same time, EUV lithography itself serves as a key platform for advancing new frontiers in nanotechnology.

In this presentation, the development history of EUV lithography—where nanotechnology both enables and is enabled—will be reviewed. In addition, key technical challenges toward next-generation lithography will be discussed, along with representative examples of nanotechnology currently under development in our research group.

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