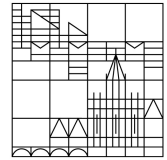


Physikalisches Kolloquium

Universität
Konstanz



Di 09.11.21
15:15 Uhr
A 701



Dr. Heiko Feldmann
Carl Zeiss SMT GmbH



Microlithography with UV and EUV light - Patterning tools with sub-nm precision

Shortly after the invention of the integrated circuit, patterning by means of light was introduced to enable the mass fabrication of electronic devices. We will present the amazing success story of how structures became increasingly smaller and nowadays enable billions of transistors or memory cells on a single chip – the basis for the electronic revolution with tremendous impact on society and everyday life.

We will start with a brief history of Moore's Law, the exponential density increase in electronic devices that has been going on for more than 50 years. Moore's Law is closely linked to corresponding improvements in optical resolution of the patterning machines. Several times, the technological limit of microlithography was anticipated. Thus far, however, a stream of inventions and developments is keeping the resolution shrinkage alive.

Today, leading-edge devices are patterned by EUV lithography using 13.5nm wavelength. We will show concepts and key technologies to enable the fully reflective optics, which are used to illuminate the master reticle and to project the de-magnified image on the semiconductor wafer. Key requirements are image resolutions around 13nm and wavefront requirements in the Angstrom level, which need to be kept stable in spite of industrial production rates of hundreds of 300mm wafers per hour.

Finally, we will give an outlook to the next generation of EUV lithography, which is currently under development to enable the next step in Moore's Law.

