Extreme Ultraviolet Phase Contrast Imaging

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Extreme Ultraviolet (EUV) lithography is the most likely candidate for adoption by the semiconductor manufacturing industry as the next generation lithography technique. In this technology, reflective optics coated with Mo/Si multilayers that provide high reflectivity in a narrow band of wavelengths near 13-nm are used for imaging. One of the remaining issues to be solved before EUV lithography can be commercialized is the reduction of defects on multilayer-coated EUV masks. Zone plate microscopy at 13-nm wavelength is an ideal technology to find and understand multilayer defects not only because it can provide very high spatial resolution (30 nm or possibly below), but also because it can relatively easily provide phase contrast imaging if a phase plate is placed in the back focal plane. In this talk we will present the design of and preliminary results from a phase-contrast zone plate microscope at the Advanced Light Source at Lawrence Berkeley National Laboratory that will be used for reflection imaging of EUV masks at 13-nm wavelength.