The aim of this work is to benchmark the resolution of EUV photoresists by printing dense L/S features in resist and analyze them with top down SEM imaging. The EUV Interference Lithography (EUV-IL) beamline installed at the Swiss Light Source which uses an undulator as light source is applied as exposure tool [1]. The patterns are exposed by coherent illumination of e-beam written masks. For the sample preparation a fully equipped cleanroom capable of 8” wafer processing is available at the beamline.

A variable dose exposure in Hydrogen Silsesquioxane (HSQ) developed in NaOH serves as reference exposure. All L/S patterns down to 14 nm hp have been resolved. The resolution limit of the beamline was experimentally determined to be 12.5 nm hp.

For chemically amplified resists (CARs) dense L/S patterns down to 18 nm hp could be resolved.

- Compared to the HSQ exposure the lower achievable resolution of CARs can be mainly assigned to acid diffusion
- So far only the resolution limit of the CARs was tested; a detailed analysis of the pitch-dependent exposure latitude will be done in future
- Simulations of the EUV source performance combined with calculations of the beamline optics revealed a pattern overlaying background of 11% in energy limiting the maximum achievable resolution. The origin of this background are the higher harmonics generated by the undulator EUV source.

- Beside the exposure itself optimization of the resist processing (e.g. film thickness, development procedure) will increase pattern quality and resolution

Acknowledgement: Michaela Vockenhuber, Markus Kropf, Bianca Haas, Anja Weber, and thanks to ShinEtsu, TOK, JSRMicro, Fujifilm, and Inpria for free resist test samples.