18th Fraunhofer IISB Lithography Simulation Workshop

May 25 – 27, 2023, Behringersmühle, Germany

Program

(status as of April 13, 2023)

Thursday, May 25

6:00 pm: Welcome reception

- 8:00 – 8:15 pm: **Welcome and introduction**, Andreas Erdmann (Fraunhofer IISB)
- 8:15 – 9:00 pm: **Lithography and the Semiconductor Device Roadmap,** Antony Yen (ASML)

Friday, May 26

- 9:00 – 9:25 am: **EUV optics at ZEISS, status and outlook**, Martin Kaumanns (Zeiss)
- 9:25 – 9:50 am: **Imaging objective for higher energy region,** Mitsunori Toyoda, Shota Yamashita, Jun Chen (Tokyo Polytechnic University)
- 9:50 – 10:15 am: **Investigation of the resolution limit for Talbot lithography with compact EUV sources**, Bernhard Lüttgenau[1,2], Sascha Brose[1,2], Serhiy Danylyuk[3], Jochen Stollenwerk[1,2,3], Carlo Holly[1,2,3] ([1]RWTH Aachen, [2]JARA, [3]Fraunhofer ILT)
- 10:15 – 10:40 am: **Extreme ultraviolet metalens by vacuum guiding**, Marcus Ossiander[1], Maryna Leonidivna Meretska[1], Hana Kristin Hampel[2], Soon Wei Daniel Lim[1], Nico Knefz[2], Thomas Jauk[2], Federico Capasso[1], Martin Schultze[2] ([1]Harvard University, [2]Graz University of Technology)

10:40 – 11:10 am: Coffee break

- 11:10 – 11:35 am: **Modeling and simulation of grayscale photolithographic patterning for optical microstructures**, Robert Leitel[1], Jiayi Lu[1], Valeriia Sedova[2], Andreas Erdmann[2] ([1]Fraunhofer IOF, [2]Fraunhofer IISB)
- 11:35 am – 12:00 pm: **Modeling the massively parallel fabrication of 2.5D and 3D profiles into triplet-triplet annihilation up-conversion process photoresists**, Valeriia Sedova[1], Florie Ogor[2], Kevin Heggarty[2], Andreas Erdmann[1] ([1]Fraunhofer IISB, [2]IMTA)
- 12:00 – 12:25 pm: **Grayscale lithography: using machine learning to explore the next step in mask development**, Jean-Baptiste Henry, Sébastien Bérard-Bergery, Sébastien Balle, Bao-Luu Tran, Loic Perraud (Leti)

12:25 – 2:00 pm: Lunch

- 2:00 – 2:25 pm: **IMEC mask roadmap and strategy towards high NA EUV era**, Kenichi Miyaguchi, Darko Trivkovic, Jane Wang, Werner Gillijns, Youssef Drissi, Ryan Ryoung han Kim (imec)
- 2:25 – 2:50 pm: **Towards an OPC rulebook: two practical examples**, Sander Blok, Sofia Leitao, Launora Bilalaj (ASML)
- 2:50 – 3:15 pm: **Exposure optimization used in Multi-Beam Mask Writer (MBMW) for leading-edge mask patterning**, Peter Hudek (IMS Nanofabrication GmbH)
- 3:15 – 3:40 pm: **AI supported defect detection on lithography masks**, Peter Evanschitzky (Fraunhofer IISB)

4:00 pm: Special event and dinner

Saturday, May 27

- 9:00 – 9:25 am: **Levelling of photoresist over topography**, Thomas Mulders, Hans-Juergen Stock (Synopsys)
- 9:25 – 9:50 am: **LWR offset: identifying imaging contrast and resist impact contributions to pattern variability**, Bernardo Oyarzun, Joost van Bree, Luc van Kessel, Ruben Maas (ASML)
- 9:50 – 10:15 am: **Multiple spectral harmonics and spatial modes EUV ptychography with automatic-differentiation**, Yifeng Shao, Sven Weerdenburg, Jacob Seifert, Paul H. Urbach, Allard Mosk, Wim Coene (TU Delft, LINX Team)

10:15 – 10:45 am: Coffee break

- 10:45 – 11:10 am: **Stitching simulation methodology for 0.55 NA EUV**, Daniel Wilson, Bram Slachter, Airat Galiullin, Tenzin Kunsel, Laura Huddleston, Friso Wittebrood, Eelco van Setten, Natalia Davydova (ASML)
- 11:10 – 11:35 am: **High NA EUV imaging trade-offs in the mask absorber material space**, Nick Pellens, Peter De Bisschop, Vicky Philipsen (imec)
- 11:35 am – 12:00 pm: **Modeling of multilayer degradation and impact on lithographic imaging metrics**, Hazem Mesilhy, Peter Evanschitzky, Andreas Erdmann (Fraunhofer IISB)
- 12:00 – 12:10 pm: **Final discussion and concluding remarks**

12:30 pm: Lunch