Contribution ID : **77** Type : **Poster**

Progress Towards an X-ray Nanolithography Facility

High-volume semiconductor device manufacturing has recently adopted lithography technology based on extreme ultraviolet radiation of wavelength 13.5 nm. A transition to 6.x nm wavelength sources is anticipated during the next decade to keep pace with the demand for device scaling predicted by Moore's Law. However, there are many challenges that must be overcome as critical dimensions approach the single-digit nanometer scale, including the availability of suitable light sources, photoresist sensitivity, and photomask defectivity.

Soft X-ray (SXR) and EUV interference lithography (IL) using synchrotron radiation has recently emerged as a powerful tool for understanding key aspects of future lithographic processes, including photoresist performance at EUV [1] and SXR wavelengths [2].

An EUV-IL exposure instrument with in situ metrology capabilities is currently in development for use at the the imaging branch of the SXR beamline of the Australian Synchrotron. We will outline key characteristics of the technical design of the X-ray Nanolithography Facility (XRNF), current status of its implementation, and the expected performance predicted using partially coherent wavefront propagation modelling of the SXR beamline and IL optics. We will also describe the metrology capabilities based on coherent diffractive imaging that will provide the required resolution and sensitivity for photomask inspection[3] and for in situ optimisation of lithographic processes.

[1] Mojarad, N., Gobrecht, J. & Ekinci, Y. Sci Rep 5, 9235 (2015).
[2] Mojarad, N., Kazazis, D., & Ekinci, Y., Journal of Vacuum Science & Technology B 39, 042601 (2021).
[3] Shen, T., Kazazis, D, Kim, H.-S., Dejkameh, A., Nebling, R., Ekinci Y. & Mocha, I., Proc. SPIE 12053,120530H, 2022.

Level of Expertise

Experience Researcher

Presenter Gender

Man

Pronouns

He/Him

Do you intend to attend UM2022

In person - Melbourne

Students Only - if available would you be interested in student travel funding

Students Only – Do you wish to take part in the Student Poster Slam

Terms and conditions (Please confirm that you have read all the requirements and agree to the conditions)

Yes

Primary author(s) : Dr VAN RIESSEN, Grant (La Trobe University)

Co-author(s) : Mr KNAPPETT, Jerome (La Trobe University); Mr HAYDON, Blair (La Trobe University); Mr HUWALD, Eric (La Trobe University); KEWISH, Cameron (ANSTO)

Presenter(s) : Mr HAYDON, Blair (La Trobe University)

Session Classification : Poster

Track Classification : Manufacturing, Engineering & Cultural Heritage