
TcSUH Bi-Weekly Seminar

Recent Advances in Neutral Particle Lithography



Prof. Jack Wolfe

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Thursday, May 16, 2019

Room 102, Houston Science Center
12:00 p.m. – 1:00 p.m.

ABSTRACT: In neutral particle proximity lithography a broad beam of energetic (e.g. 30-50 keV) helium atoms illuminates a stencil mask and transmitted beamlets transfer the stencil pattern to resist on a substrate. It has all the advantages of He⁺ ion printing, including the near absence of diffraction, limited lateral scattering, and the availability of high brightness point sources. The atoms being neutral, however, renders NPL completely immune to statistical space charge fluctuations in the beam and the unpredictable, dynamic charging artifacts that plague the ion-based approach. In this talk, I will discuss recent advances with regard to mask life, the resolution and throughput of the source, and the intriguing potential of direct damage writing in HTS and magnetic thin films and for sub-nanometer patterning of Si and graphene devices through selective desorption of passivating films using very low energy (~100 eV) beams. A practical solution to the “stencil problem” in neural probe manufacturing will be discussed.

BIO: Jack Wolfe has been active in lithography and nanofabrication for almost 45 years. His work has touched many fields, including integrated circuit (IC) manufacturing, superconductivity, information storage, and brain-machine interfaces (BMIs). He recently invented neutral particle lithography (NPL) in collaboration with Prof. Paul Ruchhoeft. It is a powerful technique that uses energetic helium atoms to fabricate IC-like patterns on fine needle-like BMI probes and could enable the development of revolutionary quantum nanosystems. He has developed a unique laboratory, the Nanosystem Manufacturing Center, whose centerpiece is a high resolution, high throughput neutral particle printer, designed and constructed with support from the NSF, NIH, and the Texas Center for Superconductivity at the University of Houston.

RSVP by Wednesday at Noon to bdherndo@central.uh.edu for Vietnamese sandwiches.

Persons with disabilities who require special accommodations to attend this lecture should call (713) 743-8213.
