

MECHANICAL & AEROSPACE ENGINEERING GRAD STUDENT SEMINAR

Low Energy Implantation with Focused Ion Beams

Friday, October 16
11:00 AM
AME Room 106

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ABSTRACT: Ion implantation is a key capability for a variety of industries. As devices continue to shrink, novel materials enter the manufacturing line, and quantum technologies become more mainstream, traditional implantation methods fall short in delivering energies, ion species, and positional precision necessary. Specifically, lowering the implantation energy while maintaining nanometer scale spot size is a technological challenge. This presentation will show an overview of techniques at Sandia National Laboratories Ion Beam Facility that allow focused ion implants 1-200 keV range for quantum relevant applications.

Additionally new developments in sub-1 keV focused ion implants into Si and 2D devices, using a focused ion beam system, validated by atom probe tomography will be shown. We illustrate that identical results for low energy ion implants can be achieved by either lowering the column voltage, or decelerating ions using bias – while maintaining good spatial resolution. Furthermore, our data reveal that standard implant modeling approaches overestimates experimental depth by a significant margin. Finally, we discuss how our results pave a way to maintaining high spatial resolution with low implantation energies.



This event is sponsored by FAMU-FSU College of Engineering and
Department of Mechanical and Aerospace Engineering

