**ION BEAM MATERIALS RESEARCH AT DOE CENTER FOR INTEGRATED NANOTECHNOLOGIES (CINT)**

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To streamline the US government support in advancing nanoscience research, Department of Energy’s Office of Science established five Nanoscale Science Research Centers (NSRCs) in 2006 at DOE’s six national laboratories: Center for Nanoscale Materials (CNM) at Argonne National Laboratory (ANL); Center for Functional Nanomaterials (CFN) at Brookhaven National Laboratory (BNL); Molecular Foundry (The Foundry) at Lawrence Berkeley National Laboratory (LBNL); Center for Nanophase Materials Science (CNMS) at Oak Ridge National Laboratory (ORNL); and Center for Integrated Nanotechnologies (CINT) jointly operated by Los Alamos and Sandia National Laboratories. While all NSRCs have common capabilities such as electron microscopy to support users, each NSRC also has its distinctive capabilities and uniquely focused research areas. One of the unique research areas at CINT is its ion beam materials research centered at two accelerator laboratories: Ion Beam Materials Laboratory (IBML) at LANL and Ion Beam Laboratory (IBL) at SNL. The CINT ion beam capabilities cover broad beam energies ranging from tens of eV to over 100 MeV using 11 accelerators/implanters equipped with a variety of ion sources and 25 beamlines/endstations. The beam size can be focused as small as 10 nm on 35 kV Raith Velion Nanoimplanter or rastered as large as 200 mm wafer size on 200 kV Danfysik Research Implanter. Besides traditional single ion beam research such as ion beam analysis, ion beam modification, and radiation effects, coupled beamlines are developed to perform ion irradiation with in situ electron microscopy; ion irradiation with in situ positron annihilation spectroscopy; dual-beam or three-beam irradiations to simulate fission/fusion extremes; nanobeam implantation to achieve deterministic defect incorporation in quantum materials etc. Several selected CINT user research projects will be highlighted.

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