The Center for Integrated Nanotechnologies (CINT) is a Department of Energy Office of Science user facility. CINT offers world-leading scientific expertise and specialized capabilities to create, characterize, and integrate nanostructured materials at a range of length scales. It is jointly operated by Los Alamos and Sandia national laboratories and leverages the unmatched scientific and engineering expertise of the host labs.

CINT supports four scientific thrusts that serve as synergistic building blocks for integration research available to the user community: Quantum Materials Systems; Nanophotonics and Optical Nanomaterials; In-Situ Characterization and Nanomechanics; and Soft, Biological, and Composite Nanomaterials. Access to capabilities is via peer-reviewed technical proposals. Visit our website: https://cint.lanl.gov.

For 2D indirect semiconductors like bilayer tungsten diselenide, isotopic purification unexpectedly blue-shifts the optical emission energy by an observable amount corresponding to the change in electronic band gap renormalization energy brought about by changes in mass. Credit: Michael Pettes, Daniel Edward Judge, Jr.

Arrays of broken-symmetry silicon nano-resonators for mid-infrared photonics, fabricated at CINT using JEOL electron beam lithography and Oxford reactive ion etching systems. Credit: Peter Jeong, Igal Brener.

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High-speed electron backscatter diffraction at CINT is 30 times faster than previous technology at mapping the structure of crystalline materials. In this image, 1.8 million crystal orientation measurements of niobium sheet were performed in just 30 minutes. Credit: Emily Brady, Eric Taleff, Nathan Heckman, Brad Boyce.

Arrays of broken-symmetry silicon nano-resonators for mid-infrared photonics, fabricated at CINT using JEOL electron beam lithography and Oxford reactive ion etching systems. Credit: Peter Jeong, Igal Brener.

A graphic of the ionic currents responsible for healthy, functional, and pathological neuronal activity. Work in CINT’s Integration Lab aims to measure these currents and how they can be modulated by drugs to hopefully find effective medications for neurodegenerative diseases. Credit: Shadi Dayeh, Youngbin Schoe, Jennifer Martinez, Jinkyung Yoo.

Trajectories of particles moving along fluid streamlines. The inlet region of this microfluidic device causes a sharp direction change, which affects the streamlines. CINT’s 3D astigmatic macroscopic images particle flow, showing trajectories organize into a hollow sheath-like structure in this region (0.5mm grid spacing). Credit: Duncan P. Ryan, James Werner.

Arrays of broken-symmetry silicon nano-resonators for mid-infrared photonics, fabricated at CINT using JEOL electron beam lithography and Oxford reactive ion etching systems. Credit: Peter Jeong, Igal Brener.

A 3D super-nanocomposite with ordered nanocylinder arrays in thin films is achieved by incorporating vertically aligned nanocomposites into a multilayer/superlattice architecture. The dimension and vertical/lateral spacings of nanocylinders can be precisely controlled. Credit: Aiping Chen.
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