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Holography with a neutron interferometer

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In 1948 Dennis Gabor introduced the technique of “holography” where an image of an object is reconstructed by using a far-field electron micrograph of the object as a transmission mask for visible light. The development of coherent laser light sources in the 1960s vitalized the field to a degree that optical security holograms are now a standard feature of many paper currencies, credit cards, and identification documents. We have reported the first demonstration of holography using neutron beams and macroscopic objects. The high penetrating ability of neutrons allows our holograms to provide details about the inner structure of objects which ordinary laser light-based visual holograms cannot. Neutron holography is a new enabling tool for interferometric testing of materials, with a unique usefulness in the analysis of buried interfaces. In addition, the same experimental configuration can be used for the characterization of coherence of neutron beams.

Primary authors: PUSHIN, Dmitry (University of Waterloo); SARENAC, Dusan (University of Waterloo); HUBER, Michael (NIST); HEACOCK, Benjamin (NCSU); ARIF, Muhammad (NIST); CLARK, Charles (NIST); SHAHI, Chandra (UMD); CORY, David (University of Waterloo)

Presenter: SARENAC, Dusan (University of Waterloo)

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