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Phase Grating Moire Interferometry

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In this talk I will present our work on developing far-field moire neutron interferometry at the National Institute of Standards and Technology's Center for Neutron Research. We have successfully built a two phase-grating moire interferometer and employed it for phase contrast imaging. This novel technique allows for broad wavelength acceptance and relaxed requirements related to fabrication and alignment, circumventing the main obstacles associated with perfect crystal neutron interferometry. In addition we provide the first demonstration that a neutron far-field interferometer can be employed to measure the microstructure of a sample. It is possible to measure the microstructure in the length scale range of 100 nm to 100 um by varying the grating spacing. Lastly, I will talk about our demonstration of a three phase-grating neutron interferometer and its promising application to accurately measure big G, the Newtonian constant of gravitation.

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