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**Probing Localization Physics with a Bose-Einstein Condensate Subject to Optical Random Potential: Interplay of Interaction and Disorder**<sup>1</sup> YONG P. CHEN, M. JUNKER, D. DRIES, C. WELFORD, J. HITCH-COCK, R. G. HULET, Department of Physics and Astronomy and Rice Quantum Institute, Rice University, Houston TX 77005, USA — The ubiquitous control over physical parameters of a Bose-Einstein condensate (BEC) subject to optical disorder makes this system an exciting playground to address many important issues in localization physics of condensed matter. Examples include Anderson localization, Bose glass, and metal-insulator transition. We have constructed an apparatus that enables us to study an optically trapped <sup>7</sup>Li BEC in the presence of various optical random potential profiles. Both the interaction and disorder parameters of the system can be tuned. I'll discuss our on-going experiments that focus on the interplay between the correlation lengths of BEC and of the disorder.

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