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**Search for flux noise sources in superconducting material using polarized neutron reflectivity** TIMOTHY CHARLTON, Oak Ridge National Lab, MICHAEL OKEEFFE, ALEXANDER MELVILLE, ANDREW J. KERMAN, JONILYN YODER, MIT Lincoln Laboratory, 244 Wood Street, Lexington, MA 02420, USA., WILLIAM OLIVER, MIT Lincoln Laboratory, 244 Wood Street, Lexington, MA 02420, USA, Research Laboratory of Electronics, Massachusetts Institute of Technology, 77 Massa — Magnetic flux noise is a dominant source of decoherence in superconducting qubits. Flux noise is believed to originate from unpaired spins at the surfaces and interfaces of superconducting thin films. Possible origins of these fluctuating spins include dangling bonds, interface states, and adsorbed molecules. To our knowledge, there has been no direct observation of magnetic induction at interfaces of these devices. Polarized neutron reflectometry is uniquely suited to provide depth-resolved spin information in layered structures. In this presentation we will report the magnetic induction as a function of depth from the surface of superconducting thin films used in qubit devices, near the superconducting transition temperature.

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