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**Electron Shot Noise and Nuclear Spin Dynamics in Spin-Blockaded Quantum Dots** MARK RUDNER, MIT, FRANK KOPPENS, Harvard University, JOSHUA FOLK, U. of Britisch Columbia, LIEVEN VANDERSYPEN, TU Delft, LEONID LEVITOV, MIT — In the spin-blockade regime of double quantum dots [1], electron transport through the system constitutes a purely electrical means of probing and manipulating the dynamics of nuclear spins. Intense interest in this system as a platform to study spin coherence and many-body dynamics has spawned a wide range of experiments [2], which have revealed many complex dynamical phenomena. Here we identify a fundamental process in which nuclear spin dynamics can be driven by electron shot noise; fast electric current fluctuations generate much slower nuclear polarization dynamics, which in turn affect electron dynamics via the Overhauser field. The resulting extremely slow current fluctuations account for a variety of observed phenomena that were not previously understood. We propose a simple model for the coupled dynamics of electron and nuclear spins that captures much of the essential physics behind these experiments and validate the model by comparison with experimental data. [1] K. Ono et al. Science 297, 1313 (2002). [2] R. Hanson et al., Rev. Mod. Phys. 79, 1217 (2007).

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