Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

Classical, Digital Communication via Rydberg Electrometry DAVID MEYER, University of Maryland, KEVIN COX, FREDRIK FATEMI, PAUL KUNZ, U.S. Army Research Laboratory — Quantum sensors based on thermal neutral atoms have shown record sensitivity to electric and magnetic fields. Applied to modulated fields, these sensors have the potential to improve on the current limitations of classical sensors for digital communication. Here we report the use of Rydberg atoms in a thermal vapor to measure amplitude-modulated RF electric fields. The modulation is detected via Electromagnetically Induced Transparency (EIT) using an optical heterodyne measurement. We implement a phase-shift-keying protocol to transmit digital information via the amplitude modulation and measure a photon-shot-noise limited channel capacity in excess of 5 Mbit/s. The bandwidth limit of this measurement is investigated and found to be limited by the EIT pumping rate in the low RF power regime.

David Meyer
University of Maryland

Date submitted: 26 Jan 2018 Electronic form version 1.4