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Vector Electrometry using Rydberg Atom Electromagnetically Induced Transparency JONATHON SEDLACEK, HARALD KÜBLER, JAMES SHAFFER, University of Oklahoma — We report on our efforts to develop an atomic standard for microwave electric fields. Our approach to microwave electrometry uses Rydberg atom electromagnetically induced transparency (EIT) and can be used to both sense microwave polarization and electric field amplitude. Microwaves couple two closely spaced Rydberg states, which have high transition dipole moments. By measuring the Autler-Townes splitting caused by the microwaves the amplitude of the electric field is measured. The polarization of the microwaves is measured by detecting differences in the lineshapes as the EIT laser polarizations are rotated. The changes in lineshape result from the weighting of different 3- and 4-level pathways available to the system as the laser polarizations vary. The experiments take place in a vapor cell, which can be miniaturized to study near field effects of microwaves or create a portable microwave electric field standard.

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