Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Measurement of strong electric fields using room-temperature Rydberg-EIT STEPHANIE MILLER, DAVID ANDERSON, University of Michigan - Ann Arbor, CHRISTOPHER HOLLOWAY, JOSHUA GORDON, National Institute of Standards and Technology (NIST) - Boulder, GEORG RAITHEL, University of Michigan - Ann Arbor — We present a measurement of strong electric fields using room-temperature Rydberg-EIT. In a vapor cell, we drive microwave transitions between ^{85}Rb Rydberg states and use the resultant resonances as probes of the applied field. We focus on the $65D_{5/2}$ - $66D_{5/2}$ two-photon transition and model the spectra with a non-perturbative Floquet analysis, which provides information about the strong microwave-induced n- and ℓ-mixing effects on levels and excitation rates. We are able to measure fields up to $\sim$250 V/m to within $\sim$1% relative uncertainty. This is approximately 50 times higher in intensity than we have previously measured with this technique. We are also able to account for electric field inhomogeneities within the vapor cell by comparing the experimental line strengths to the calculated excitation rates. The accessible field range can be extended to even higher fields by utilizing transitions between lower-lying Rydberg states, where dipole moments generally are smaller and larger fields are needed to enter the strong-field regime. We also discuss how the sensitivity of the method at small fields can be enhanced by analyzing minute changes of the EIT-signatures that occur at fields much lower than where Autler-Townes splitting occurs.

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Date submitted: 01 Feb 2015 Electronic form version 1.4