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Atom-interferometric measurement of Stark level splittings JIAN-MING ZHAO, Institute of Laser Spectroscopy, Shanxi University, GEORG RAITHEL, Department of Physics, University of Michigan — Rydberg atoms are highly sensitive to external electric fields due to their large polarizability, scaling as n^7 (n is the principal quantum number). In cesium, nS Rydberg levels mix with nearby (n-4) high-l states, forming sequences of avoided crossings. Mixed adiabatic/diabatic passages through these crossings [1] are employed as beam splitters and recombiners in an atom-interferometric measurement of energy level splittings [2]. We subject cold cesium atoms to laser-excitation, electric-field and detection sequences that constitute an (internal-state) atom interferometer. For the read-out of the interferometer we utilize state-dependent collisions, which selectively remove atoms of one kind from the detected signal. We investigate the dependence of the interferometric signal on timing and field parameters, and find good agreement with quantum simulations of the interferometer. Fourier analysis of the interferometric signals yield coherence frequencies that agree with corresponding energy-level differences in calculated Stark maps. [1] L. Wang, et al, New J. Phys. **17** 063011 (2015). [2] L. Wang, et al, Phys. Rev. A **92** 033619 (2015).

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