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Scalar and vector differential light shift measurements in optical lattice-trapped ^{87}Rb RADU CHICIREANU, KARL NELSON, STEVEN OLMSCHENK, TREY PORTO, NIST/JQI — The existence of 'magic wavelengths' for hyperfine transitions in alkali atoms is of great interest for their applications in quantum information and frequency metrology. Magic wavelength predictions for Rb and Cs have met with some controversy, and it is likely that they do not exist in 'traditional' optical lattices. In a state-dependent lattice though, the scalar and vector differential light shifts can have opposite signs, leading to a prospected significant reduction in the sensitivity of the transition frequency to fluctuations in the trapping light field. We investigate this effect, and present preliminary results of a precision measurement of light shifts in lattice-trapped ^{87}Rb, focusing on the differential light shift between the ground-state hyperfine levels F=1,2.

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