Polarization spectroscopy of an excited state transition

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We demonstrate polarization spectroscopy of an excited state transition in room temperature cesium vapor. An anisotropy induced by a circularly polarized pump beam on the D2 transition is observed using a weak probe on the 6P3/2 to 7S1/2 transition. When the D2 transition is saturated, a sub-natural linewidth feature is observed which theoretical modeling shows is enhanced by Doppler averaging. Polarization spectroscopy provides a simple modulation-free signal suitable for laser frequency stabilization to excited state transitions.

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