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Studies of Raman Transitions in Cold Atoms in Arbitrary Magnetic Fields FRANK NARDUCCI, JON DAVIS, EMILY CLIFTON, SARA DESAVAGE, KYLE GORDON — Raman transitions are ubiquitous in atomic and molecular systems. Of particular interest to us is the application of Raman transitions as atom beam splitters and as atom mirrors: specifically of the type that might be used in the construction of a gradient magnetometer atom interferometer. In contrast to other types of interferometers, e.g. gravimeters, gravity gradiometers and gyroscopes, a magnetic gradiometer interferometer requires the use of magnetically sensitive Zeeman levels in the Raman process. We report our theoretical studies of the Raman resonances in arbitrary magnetic fields for various polarizations of the Raman driving fields. We present experimental measurements performed in a cold sample of 85Rb with both orthogonal linear and parallel circular polarization for the Raman fields. A novel and time efficient detection scheme is presented.

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