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**Laser Spectroscopy of Rydberg Atoms in Strong Magnetic Fields**

B. KNUFFMAN, C. HEMPEL, R. MHASKAR, E. PARADIS, M. SHAH, G. RAITHEL, University of Michigan, Focus Center — We report on spectroscopy measurements using narrow band laser excitation ( $< 5$  MHz) to probe Rydberg states of laser cooled Rb atoms in high magnetic fields. We report on the energy structure of these states and discuss measuring atomic properties, such as the magnetic dipole moment and other magnetic or electric multipole moments. Additionally, the high energy resolution provided by this spectroscopy technique allows investigations to probe the interactions between Rydberg atoms in high magnetic fields. These are the first high-energy-resolution studies of cold Rydberg atoms in large magnetic fields, where the properties of Rydberg atoms differ significantly from the low-field case.

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