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Laser Spectroscopy and Cooling of Atomic Gadolinium

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Lanthanide elements are of interest because of their complex internal structures and large ground state magnetic moments. These unique features can provide solutions to help overcome current challenges and obstacles in quantum phenomenon that are not possible with other atomic species traditionally used in ultracold atom experiments. We present results on high resolution spectroscopy and progress towards laser cooling and trapping of atomic gadolinium (Gd). Laser cooling and trapping Gd will serve as the starting point for novel investigations into next generation frequency standards, quantum enhanced metrology, and ultracold dipolar physics.