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New Facility to Probe Physics With Degenerate Bose and Fermi Gases[1] RYAN PRICE, DANIEL CAMPBELL, SUBHADEEP DE, IAN SPIELMAN, JQI, NIST and the University of Maryland — A new facility to produce dual species degenerate Bose and Fermi gases is under construction at JQI. The apparatus is designed to create degnerate mixtures of bosonic rubidium (^{87}Rb) and fermionic lithium (^{6}Li). At the present, the trapping of Rb has been achieved with approximately 10^9 atoms in the MOT and 10^7 atoms captured in a 1064 nm dipole trap after RF evaporation. Further optimization is currently being performed to increase atom count in the dipole trap before proceeding with BEC studies. Concurrently progress has been made in constructing the 670.9 nm laser system for cooling and trapping Li. Furthermore a saturation absorbtion spectroscopy frequency locking scheme for Li implementing fully programmable FPGA circuit is being constructed to provide versatile and programmable frequency locking control and a future configurable platform for other electronics used within the experiment. Future progress will include the creation of a Rb BEC along with novel studies of spinor physics and then the implementation of the Li system to produce the degenerate Rb-Li mixture.

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