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Towards Rydberg dressing of a lithium Fermi gas ELMER GUARDADO-SANCHEZ, PETER SCHAUSS, DEBAYAN MITRA, PETER BROWN, WASEEM BAKR, Princeton University — One attractive route towards finite-range interactions in ultracold gases is off-resonant coupling to Rydberg states, the so-called Rydberg dressing. Lithium is an interesting candidate due to its light mass and therefore fast dynamics. We report on the progress of Rydberg spectroscopy of lithium p-states with an ultra-violet laser at 230nm. We achieve narrow linewidth UV-light of up to 80mW by frequency-quadrupling of an amplified diode laser at 920nm locked to a ULE cavity. As a first step we implemented a V-type spectroscopy in a lithium cell and afterwards we plan to perform high-resolution loss spectroscopy in our quantum gas microscope setup. The long-term goal is a Fermi gas with tunable finite-range interactions under the microscope.

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