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One to five photon microwave ionization of Li Rydberg atoms JOSHUA GURIAN, HARUKA MAEDA, THOMAS GALLAGHER, University of Virginia — Microwave ionization is a way of connecting field ionization and photoionization. For low n Li Rydberg states the applied microwave frequency is much less than the Kepler frequency. In this well studied regime, microwave ionization occurs by field ionization. In fact, all regimes except the opposite extreme, the microwave photoionization limit, have been studied. Here we report the first measurements of the one to five-photon ionization of Li Rydberg atoms by 17.85 GHz fields. We observe clear steps in the ionization rate as a function of binding energy, so that we can easily see the differences between the one to five photon ionization rates. Somewhat surprisingly, they are not very different. Analysis of the final states of the atoms not ionized by the microwaves shows that population is concentrated in very high n states. This work has been supported by the National Science Foundation.

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