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Connecting field ionization to photoionization via 17 GHz microwave fields JOSHUA GURIAN, University of Virginia, HARUKA MAEDA, PRESTO, Japan Science and Technology Agency, THOMAS GALLAGHER, University of Virginia — Microwave ionization of hydrogenic Rydberg atoms at frequencies below the classical Kepler frequency occurs by direct field ionization and is well understood. Microwave ionization is less understood as the microwave frequency increases beyond the Kepler frequency, $\omega = 1/n^3$, towards the photoionization limit, $\omega \rightarrow 1/n^2$, where ionization by absorption of one microwave photon is possible. Here we present first results connecting field ionization to photoionization using a 17.05 GHz microwave field. Ionization requiring one to seven photons is clearly resolved, but all of these processes require similar microwave fields. In addition the fields required for single photon ionization are approximately two orders of magnitude lower than predicted by perturbation theory. This work has been supported by the National Science Foundation.

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