Homoclinic Tangle Approach to Ionization of Highly Excited Rydberg Atoms KORANA BURKE, KEVIN MITCHELL, University of California Merced — A highly excited Rydberg atom exposed to periodic external electric field impulses exhibits chaotic behavior. We study the system where an atom is exposed to alternating positive and negative impulses. We show that ionization of this system is organized by a homoclinic tangle attached to a fixed point at infinity. We present theoretical calculations for predicting the homoclinic tangle signature in a proposed experimental setup. Using the geometric and topological structure of the homoclinic tangle we show how survival probability for the starting wave-packet changes as a function of impulse timing, strength and duration.

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