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Computing Rydberg Electron Transport Rates via Classical Periodic Orbits SULIMON SATTARI, KEVIN MITCHELL, Univ of California - Merced — Electron transport properties of chaotic atomic systems may be computable from classical periodic orbits. This technique allows for replacing a Monte Carlo simulation launching millions of orbits with a sum over tens or hundreds of properly chosen periodic orbits. A firm grasp of the structure of the periodic orbits is required to obtain accurate transport rates. We apply a technique called homotopic lobe dynamics (HLD) to understand the structure of periodic orbits to compute the ionization rate of a hydrogen atom in strong parallel electric and magnetic fields. HLD uses information encoded in the intersections of stable and unstable manifolds of a few orbits to compute all relevant periodic orbits in the system. The ionization rate computed from periodic orbits using HLD converges exponentially to the true value as a function of the highest period used. We then use periodic orbit continuation to accurately compute the ionization rate when the field strengths are varied. The ability to use periodic orbits in a mixed phase space could allow for studying transport in even more complex few body systems.

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