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Interpreting Orbit Profiles Obtained from Quantum Mechanically Derived Recurrence Spectra MATTHEW LEN KEELER, University of MN - Morris — The application of scaled energy spectroscopy (SES) to quantum spectra is used to obtain orbit profiles that are composed of the classical stability, launching angle probability, and quantum mechanical effects. To extract classical orbit stability requires consideration of all of these components. Orbit profiles generated using SES on quantum spectra are compared with profiles generated from classical calculations. The SES calculation shows interference between the main orbit and primitive repetitions. A simple analytical formula has been derived to predict the number of oscillation nodes in any given orbit below the ionization threshold. In addition, the quantum mechanically derived profiles show an asymmetry in orbit probability that is not apparent in the classical calculation. The uphill to downhill strength ratio can be predicted with an analytical formula based on the calculated dipole moment of the primitive uphill and downhill trajectories. Classical and quantum orbit profile calculations demonstrating the dependency of the derived analytical formulas will be presented.

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