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Structure of Resonances in Atomic Three Body Systems[1] DANIEL DIAZ, CHI-YU HU, ZOLTAN PAPP, California State University, Long Beach — Atomic resonances are short-lived quantum states. They can be modeled as the complex-energy solutions of the Schrödinger equation. A three-particle system may have several genuinely different asymptotics, which are difficult to fulfill with one wave function. Therefore, we adopted the Faddeev method, which amounts to splitting the wave function into components such that each component is responsible only for one kind of asymptotics. To incorporate the long-range Coulomb interactions we also needed to cut the interactions in the three-body configuration space a' la Merkuriev. We solved the Faddeev-Merkuriev integral equations by approximating the potential kernels in the three-body configuration space on a Coulomb-Sturmian basis. The Coulomb-Sturmian matrix elements of the three-body Coulomb Green's operator have been evaluated as a complex contour integral of the two-body Green's operators. In this study we reinvestigated the resonances of the e-Ps system. Our particular focus was the broad resonances found earlier by us. We reestablished their existence and propose a mechanism that creates those broad resonances lined up to the thresholds. We now aim to look for similar resonances in other three-body systems and different spin states of the e-Ps system. We specifically look at the resonances of H-e^+ and H-e systems.

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