

Abstract Submitted
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Numerical calculation of supercritical Dirac resonance parameters by analytic continuation¹ EDWARD ACKAD, MARKO HORBATSCH, York University, Toronto, Ontario, Canada — The spectrum of the Dirac equation for hydrogen-like systems with extended nuclei becomes complicated when the nuclear charge exceeds a critical value $Z \approx 170$, since the lowest bound state becomes a resonance in the negative energy continuum. We address the problem of computing the resonance parameters by extending the mapped Fourier grid method to incorporate either complex scaling (CS) of the radial coordinate, or alternatively a complex absorbing potential (CAP). The method is tested on the case of quasimolecular Uranium-Californium collisions in the monopole approximation. The method of CAP is found to be more stable than CS [1]. The decay widths $\Gamma(1S\sigma_{1/2})$ are obtained to higher precision than previously reported in the literature [2]. Current results for multi-channel calculations will also be presented.

[1] E.Ackad and M. Horbatsch Phys. Rev. A 75 (2007) in press

[2] J. Reinhardt, B. Müller, W. Greiner Phys. Rev. A 24 103 (1981)

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