Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Non-universal bound states of two identical heavy fermions and one light particle[1] ARGHAVAN SAFAVI, MIT, ITAMP, SETH RITTENHOUSE, Western Washington University, DORTE BLUME, Washington State University, HOSSEIN SADEGHPOUR, ITAMP — We study a system of two identical heavy fermions of mass M and light particle of mass m. The interspecies interaction is modeled using a short-range two-body potential with positive s-wave scattering length. We impose a short-range boundary condition on the logarithmic derivative of the hyperradial wavefunction and show that, in the regime where Efimov states are absent, a non-universal three-body state "cuts through" the universal three-body states previously described by Kartavtsev and Malykh [O. I. Kartavtsev and A. V. Malykh, J. Phys. B 40, 1429 (2007)]. We study the effect of the non-universal state on the behavior of the universal states and use a simple quantum defect theory, utilizing hyperspherical coordinates, to explain the existence of the non-universal state. An empirical two-state model is employed to quantify the coupling of the non-universal state to the universal states.

[1]This work was supported by NSF through a grant for the Institute for Theoretical Atomic, Molecular and Optical Physics at Harvard University and Smithsonian Astrophysical Observatory and through grant PHY-1205443.

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Date submitted: 24 Jan 2013 Electronic form version 1.4