

Abstract Submitted
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Interactions between bosonic and fermionic metastable He atoms

J. F. BABB, ITAMP, Harvard-Smithsonian — Mixtures of spin-polarized metastable ^3He atoms and ^4He atoms are unique systems of current interest for studies of ultra-cold gases. The s -wave scattering length for collisions of ^4He atoms was measured to be $^{4-4}a = 11.3 \text{ nm}$ (+2.5, -1 nm) [1] and recent calculations find $8 < ^{4-4}a < 12 \text{ nm}$ [2]. The scattering length ^{3-4}a for fermion-boson collisions is presently indeterminate in sign and magnitude, but it has been predicted to fall in the ranges $^{3-4}a < -25 \text{ nm}$ or $^{3-4}a > 46 \text{ nm}$ [2,3]. In this talk, with regard to improving the theoretical value of ^{3-4}a , the data characterizing $^3\text{He}(2^3S)-^4\text{He}(2^3S)$ interactions primarily in the molecular $^5\Sigma_g^+$ state are reevaluated and additional calculations are presented. Supported in part by the NSF. [1] S. Seidelin, *et al.*, Phys. Rev. Lett. **93** (2004), 090409. [2] A. S. Dickinson, F. X. Gad  a, and T. Leininger, J. Phys. B **37** (2004), 587. [3] R. J. W. Stas, J. M. McNamara, W. Hogervorst, and W. Vassen, Phys. Rev. Lett. **93** (2004), 053001.

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