

Abstract Submitted  
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**Illustrating the universal relations for a trapped four-fermion system with arbitrary s-wave scattering length**<sup>1</sup> K. DAILY, D. BLUME, Washington State University — A two-component four-fermion system with equal masses, interspecies s-wave scattering length  $a_s$ , and vanishing intraspecies interactions under external spherically symmetric harmonic confinement is considered. For all calculations we employ a correlated Gaussian basis set expansion approach. We determine the energies and various structural properties of the energetically lowest-lying gaslike state throughout the crossover for various ranges of the underlying two-body potential. Extrapolating to the zero-range limit, our numerical results show explicitly [1] that the total energy, the trap energy, as well as certain aspects of the pair distribution function and of the momentum distribution are related through the so-called integrated contact intensity  $I(a_s)$  [2]. Furthermore, it is shown explicitly that the total energy and the trap energy are related through a generalized virial theorem [3] that accounts for a nonzero range.

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[3] F. Werner, Phys. Rev. A **78**, 025601 (2008).

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