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Molecular condensate fraction of two-component few-fermion systems under harmonic confinement[1] K.M. DAILY, D. BLUME, Washington State University — Using a non-perturbative stochastic variational approach, we perform a bottom-up investigation of non-local properties of harmonically trapped equal-mass s-wave interacting two-component few-fermion systems [1]. For small but positive interspecies s-wave scattering lengths a_s, pairs of opposite spin fermions form tightly bound bosonic dimers that condense to form a molecular Bose-Einsten condensate. We propose a measure of the molecular condensate fraction based on the two-body density matrix and apply this measure to systems with up to six particles. Furthermore, we calculate the spherical component of the momentum distribution associated with the center of mass of pairs of fermions. This momentum distribution develops a double peak structure as the scattering length decreases from large positive to small positive values. Our numerical results are confirmed analytically. In particular, our analytical expressions reproduce the numerical results with high accuracy and, furthermore, provide a clear interpretation of the double peak structure of the momentum distribution.

[1] D. Blume and K. M. Daily, Comptes Rendus Physique, in press (2011).

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Kevin Daily
Washington State University

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