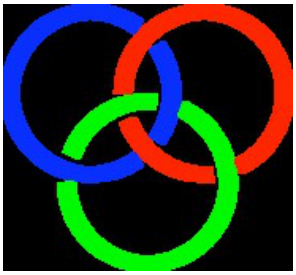

ID de Contribution: **23** Type: **Non spécifié**

Finite-range and Mean-field Effects in Recombination Rate of Trapped Cold Atomic Gasses

lundi 10 octobre 2011 17:20 (40 minutes)

The zero-range model subjects free solutions to the Schrödinger equation to the Bethe-Peierls boundary condition at zero separation as a way of implementing the scattering length. The range of the potential can be incorporated by using the effective range expansion in the boundary condition [1]. This removes the problematic Thomas collapse yet the Efimov effect remains. Alternatively, a multichannel model [2] not only has finite effective range but also naturally describes the otherwise phenomenological dependence of the scattering length on applied magnetic field as utilised in Feshbach resonance techniques.
We calculate the recombination rate of cold bosonic gases within the three-body hidden crossing theory [3], and investigate finite-range effects by comparing the results from the zero-range and finite-range models.
Finally we extend the model to include many-body effects through the mean-field and investigate how this affects the recombination rate.
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