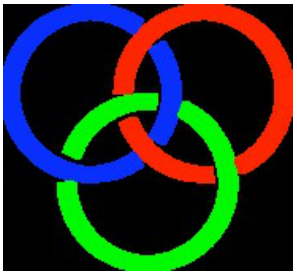

ID de Contribution: **24** Type: **Non spécifié**

Collapse of Bose-Einstein condensate near Feshbach resonance in two-channel Gross-Pitaevskii model

vendredi 14 octobre 2011 11:20 (40 minutes)

Feshbach resonances are an experimental tool to effectively tune the inter-atomic interaction – in particular, the scattering length – in trapped cold gases. When the scattering length becomes large and negative, the condensed bose-gas collapses.

Theoretically condensates are often described using the Gross-Pitaevskii model with a variable-strength zero-range interaction which mimics phenomenologically the effects of Feshbach resonances.

We use here a Gross-Pitaevskii model with a two-channel zero-range potential which not only naturally describes the Feshbach resonance but also includes finite-range effects. We show that this model is able to naturally describe the collapse of the condensate, and we also compare the two-channel results with the ordinary single-channel Gross-Pitaevskii model.

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