Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Photoassociation in a Bose-Einstein condensate: Many-body treatments with realistic molecular potentials PASCAL NAIDON, FRANÇOISE MASNOU-SEEUWS, Laboratoire Aimé Cotton — Photoassociation is a process creating an excited diatomic molecule from a pair of colliding cold atoms by use of a laser field. Photoassociation in a Bose-Einstein condensate is often well described by the standard Gross-Pitaevskii equation (GP) with a complex scattering length. However, for situations where the pair dynamics plays a significant role, one must go beyond this picture. We have considered two many-body models: one is based on the cumulant method [1] and the other is inspired by the pair wave function approach [2]. Both models are used with realistic molecular potentials, so that we can address the nonperturbative regimes. For continuous lasers of moderate intensities ($<$kW/cm^2), both models agree with the GP description. For higher intensities, the models predict the formation of noncondensed atoms instead of molecules, depending on the experimental conditions.

References
[1] T. Köhler, T. Gasenzer and K. Burnett, Phys. Rev. A 67, 013601 (2003)
[2] P. Naidon and F. Masnou-Seeuws, Phys. Rev. A 68, 033612 (2003)

Pascal Naidon
Laboratoire Aimé Cotton

Date submitted: 08 Feb 2005 Electronic form version 1.4