Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Feshbach resonances in optical lattices DENNIS DICKERSCHEID, ITP Utrecht University, D. VAN OOSTEN COLLABORATION, H. T. C. STOOF COLLABORATION — In the last few years there has been much excitement in the field of ultracold atomic gases. In a large amount this is due to the use of so-called Feshbach resonances and, in addition, the use of an optical lattice for the atoms. Recently, the first steps have been made to experimentally combine these techniques, which can both be used to tune the interactions between the atoms. Motivated by these developments, we show that the physics of these systems is described by a generalized Hubbard model for which the microscopic parameters are determined by the details of the lattice and the experimentally known parameters of the Feshbach resonance in the absence of the optical lattice. As a particular application we also discuss the phasediagrams of a Bose gas and a Bose-Fermi mixture near a Feshbach resonance in an optical lattice.

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Date submitted: 30 Nov 2005 Electronic form version 1.4