

Abstract Submitted  
for the MAR07 Meeting of  
The American Physical Society

**Two Critical velocities for a superfluid in a periodic potential**

BIAO WU, JUNREN SHI, Institute of Physics, Chinese Academy of Sciences, Beijing, China — In contrast to a homogeneous superfluid which has only one critical velocity, there exist two critical velocities for a superfluid in a periodic potential. The first one, which we call inside critical velocity, is for a macroscopic impurity to move frictionlessly in the periodic superfluid system; the second, which is called trawler critical velocity, is the largest velocity of the lattice for the superfluidity to maintain. The result is relevant to the superfluidity observed in the Bose-Einstein condensate in an optical lattice and supersolid helium.

Biao Wu  
Institute of Physics, Chinese Academy of Sciences, Beijing, China

Date submitted: 20 Nov 2006

Electronic form version 1.4