

Abstract Submitted
for the APR05 Meeting of
The American Physical Society

Neutrino Superfluidity JOSEPH KAPUSTA, School of Physics and Astronomy, University of Minnesota, Minneapolis, MN 55455 — It is shown that Dirac-type neutrinos display BCS superfluidity for any nonzero mass. The Cooper pairs are formed by attractive scalar Higgs boson exchange between left- and right-handed neutrinos; in the standard $SU(2)\times U(1)$ theory, right-handed neutrinos do not couple to any other boson. The value of the gap, the critical temperature, and the Pippard coherence length are calculated for arbitrary values of the neutrino mass and chemical potential. Although such a superfluid could conceivably exist, detecting it would be a major challenge.

Joseph Kapusta
School of Physics and Astronomy, University of Minnesota
Minneapolis, MN 55455

Date submitted: 15 Mar 2005

Electronic form version 1.4