

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Particle-Hole Excitations and the BCS Ground State J.D. FAN, Southern University and A&M College, Baton Rouge, Louisiana, USA, YURIY MALOZOVSKY, Southeastern Louisiana University — We show that the well-known BCS Hamiltonian in terms of the BCS ground state represents, in fact, the generator of the particle-hole pairs and that the BCS ground state describes both the particle-hole excitations as well as the pairing condensate of Cooper's pairs. We calculate the contribution of particle-hole excitations to the ground state energy. We show that the particle-hole pairs in the case of attractive interaction significantly lower the ground state energy, which means that the BCS ground state is not really the ground state. In contrast, for the repulsive interaction the particle-hole excitations just renormalize the ground state energy. In the case of the repulsive interaction the condensate of bound pairs would lead to the real ground state of the system as shown.

Yuriy Malozovsky
Southeastern Louisiana University

Date submitted: 01 Feb 2005

Electronic form version 1.4