Abstract Submitted
for the PSF17 Meeting of
The American Physical Society

Quantum Mechanism of Condensation and High Tc Superconductivity[1] SHOUHONG WANG, Indiana Univ - Bloomington, TIAN MA, Sichuan U — We present a new quantum mechanism of condensates and superconductivity. First, we postulate that the quantum mechanical wave function $\psi = |\psi|e^{i\varphi}$ is the common wave function for all particles in the same class determined by the external potential $V(x)$, $|\psi(x)|^2$ represents the distribution density of the particles, and $\frac{\hbar}{m}\nabla\varphi$ is the velocity field of the particles. This is an entirely different interpretation from the classical Bohr interpretation, removes all absurdities. Second, we show that the key for condensation of bosonic particles is that their interaction is sufficiently weak to ensure that a large collection of boson particles are in a state governed by the same condensation wave function field ψ under the same bounding potential V. The formation of superconductivity comes down to conditions for the formation of electron-pairs, and for the electron-pairs to share a common wave function. Based on the PID interaction potential of electrons and the average-energy level formula of temperature, these conditions for superconductivity are explicitly derived. Also we obtain both microscopic and macroscopic formulas for Tc, and obtain the field and topological phase transition equations for condensates.

[1]The work was supported in part by the US National Science Foundation (NSF), the Office of Naval Research (ONR) and by the Chinese National Science Foundation.

Shouhong Wang
Indiana Univ - Bloomington

Date submitted: 14 Oct 2017 Electronic form version 1.4