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Alternative electrodynamic equations for superconductors: theoretical and experimental implications

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The theory of hole superconductivity⁽¹⁾ has been proposed as an alternative to the conventional theory of superconductivity to describe both high T_c and conventional superconductors. It has many elements in common with the conventional London-BCS theory as well as profound differences. In particular, the macroscopic electrodynamic equations governing superconductors are predicted to be different in the new theory, which leads to prediction of unexpected effects: penetration of electric fields into superconductors, spontaneous electric fields around superconductors, spherical aggregation of superconducting microparticles in an electric field (Tao effect), spin currents in the ground state of superconductors, changes in the plasmon dispersion relation. These predictions are experimentally testable. Other new and unexpected effects will be discussed.

⁽¹⁾ References in <http://physics.ucsd.edu/~jorge/hole.html>

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