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Detection of Higgs mode in D-wave Superconductors YAFIS BARLAS, CHANDRA VARMA, University of Califronia at Riverside — Higgs modes, which are collective excitations of the amplitude of the order parameter, have zero spin and no charge, do not couple directly to experimental probes. They are, however, linearly coupled to excitations which shake the ground state and therefore appear as poles or branch-cuts in their self-energy. In the superconducting state the Higgs modes can be distinguished from other excitations because they can only appear as satellites which steal all their spectral weight from excitations which promote superconductivity. This is an observable effect if such excitations and the Higgs modes are not too far separated in energy. We show that the Higgs mode in the A_{1g} Raman scattering channel appears as a sharp resonance below 2Δ in the spectral weight of excitations responsible for superconductivity in Cuprates in a class of theories. Comparison is made with existing experiments and further experiments to confirm or rule out the idea are proposed.

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