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Orbital fluctuation mediated S_{++} wave state based on the SC-VC$_\Sigma$ method – Impact of vertex correction for the gap equation SEIICHIRO ONARI, HIROSHI KONTANI, Nagoya University — We develop the theory of superconductivity by introducing the vertex correction (VC). Although the Coulomb interaction violates Migdal's theorem, the VC for the gap equation have usually been neglected for simplicity. However, the VC is inevitable to satisfy Ward identity. Here, we show that S_{++} wave state mediated by the orbital fluctuation is favored by the VC for the gap equation. Previously, we have shown that the orbital fluctuations are strongly enhanced due to the spin-orbital mode-coupling described by the VC for the irreducible susceptibility. The structural phase transition and softening of shear modulus C_{66} are naturally explained by the orbital fluctuations. In this study, both the VC and the self-energy (Σ) are obtained self-consistently (SC-VC$_\Sigma$ method). By using the SC-VC$_\Sigma$ method, we aim to understand whole phase diagram including the superconducting state in H-doped LaFeAsO and LiFeAs.

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