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Itinerancy-Enhanced Quantum Fluctuation of Magnetic Moments in Iron-Based Superconductors[1] YU-TING TAM, DAO-XIN YAO, Sun Yat-sen university, WEI KU, Brookhaven National Laboratory — We investigate the influence of itinerant carriers on dynamics and fluctuation of local moments in Fe-based superconductors, via linear spin-wave analysis of a spin-fermion model containing both itinerant and local degrees of freedom.Surprisingly against the common lore, instead of enhancing the (π,0) order, itinerant carriers with well nested Fermi surfaces are found to induce a significant amount of *spatial* and temporal quantum fluctuation that leads to the observed small ordered moment. Interestingly, the underlying mechanism is shown to be intra-pocket nesting-associated long-range coupling rather than the previously believed ferromagnetic double-exchange effect. This challenges the validity of ferromagnetically compensated first-neighbor coupling reported from short-range fitting to the experimental dispersion, which turns out to result instead from the ferro-orbital order that is also found instrumental in stabilizing the magnetic order. *Y.-T. Tam, D.-X. Yao and W. Ku, Phys. Rev. Lett. 115, 117001(2015)

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