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Itinerancy enhanced quantum fluctuation of magnetic moments in iron-based superconductors¹ YU-TING TAM, DAO-XIN YAO, Sun Yat-Sen University, China, WEI KU, Brookhaven Natl Lab — 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 $(\pi,0)$ order, itinerant carriers with well nested Fermi surfaces is found to introduce significant amount of spatial and temporal quantum fluctuation that leads to the observed small ordered moment. Interestingly, the underlying mechanism is shown to be nesting-associated long-range coupling, rather than the previously believed ferromagnetic double-exchange effect. This talk will also address the strongly asymmetric suppression of magnetic order via electron- and hole-doping.

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