Abstract Submitted
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Orbital Nematic Instability in Two-Orbital Hubbard Model: A Renormalization-Group Study MASAHISA TSUCHIIZU, Department of Physics, Nagoya University, Japan, SEIICHIRO ONARI, Department of Applied Physics, Nagoya University, Japan, HIROSHI KONTANI, Department of Physics, Nagoya University, Japan — Motivated by the nematic electronic fluid phase in $Sr_3Ru_2O_7$, we analyze the (d_{xz}, d_{yz})-orbital Hubbard model by the one-loop renormalization-group method [1]. We find that, in the weak-interaction case, the $q = 0$ component of the orbital susceptibility $\chi^{q}(q)$ is critically enhanced by the Aslamazov-Larkin (AL) type vertex correction due to the superconducting fluctuations. In the strong-interaction case, we also find the development of $\chi^{q}(q)$ driven by the AL-type vertex correction due to spin fluctuations, consistently with the perturbation analysis [2]. Thus the strong orbital nematic fluctuation, i.e., orbital Pomeranchuk instability, emerges near the magnetic or superconducting quantum criticality. This mechanism of orbital nematic order presents a natural explanation for the nematic order in $Sr_3Ru_2O_7$, and is expected to be realized in various multi-orbital systems, such as Fe-based superconductors [3].

[1] M. Tsuchiizu, S. Onari, and H. Kontani, arXiv:1209.3664.
[2] Y. Ohno, M. Tsuchiizu, S. Onari, and H. Kontani, arXiv:1209.3629.
[3] S. Onari and H. Kontani, Phys. Rev. Lett. **109**, 137001 (2012).

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