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Pairing instabilities of a Non-Fermi liquid in the presence of nematic and gauge fluctuations[1] ANDREJ MESAROS, MICHAEL J. LAWLER, EUN-AH KIM, Cornell University — In the absence of Fermi-liquid starting point, instabilities of non-Fermi liquids are theoretically challenging problems. Here we note that a non-Fermi liquid state occurring at $\nu = 1/2$ may be a promising concrete case for theoretical investigation of the issue for two reasons. Firstly, exotic ordered states observed in half-filled Landau levels, namely the FQH state at $\nu = 5/2$ which is most likely best described as a paired state, and the quantum Hall nematic state at $\nu = 9/2$, present a compelling possibility that the non-Fermi liquid state with gauge fluctuations at $\nu = 1/2$ is close to instabilities towards these ordered states. Secondly, a recent theoretical progress [Metlitski et al., arXiv:1403.3694] offers a scheme for a controlled renormalization group study of the problem. We will discuss competition between the two fluctuations in promoting or suppressing a superconducting instability, based on the phase diagram we obtain from a renormalization group calculation.

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Andrej Mesaros
Cornell University

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