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Intrinsic topological superfluidity – fluctuations and response K LEVIN, CHIEN-TE WU, BRANDON ANDERSON, RUFUS BOYACK, James Franck Institute — Recent interest in topological superconductivity is based primarily on exploiting proximity effects to obtain this important phase. However, in cold gases it is possible to contemplate "intrinsic" topological superfluidity produced with a synthetic spin-orbit coupling and Zeeman field. It is important for such future experiments to establish how low in temperature one needs to go to reach the ordered phase. Similarly, it will be helpful to have a probe of the normal (pseudogap) phase to determine if the ultimate superfluid order will be topological or trivial. In this talk, we address these issues by considering fluctuation effects in such a superfluid, and calculate the critical transition temperature and response functions. We see qualitative signatures of topological superfluidity in spin and charge response functions. We also explore the suppression of superfluidity due to fluctuations, and importantly find that the temperature scales necessary to reach topological superfluidity are reasonably accessible [1]. [1] Phys. Rev. B 92, 134523 (2015)

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