Disorder Induce the Topological Superfluid in Rashba Spin-Orbit Coupled Fermi Gases[1] XIAOSEN YANG, Jiangsu University — We present a theoretical study of the effects of Anderson disorders on the two- and three-dimensional attractive Fermi gases with Rashba spin-orbit coupling. By self-consistent Born approximation approach, we show that the Anderson disorder can induces topological phase transition from topological trivial superfluid phase into nontrivial phase in two dimension case. In three dimension case, the disorder can induce two types of topological nontrivial superfluid phases in which the excitation has gapless nodes. Additionally, the pair coherence length is logarithmic divergent for two dimension case and not divergent for three dimension case. The divergence behavior maybe used to determine the topological phase transition in experiment.

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