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Time-reversal invariant bilayer spin-orbit coupled Bose-Einstein condensates MATTHEW MAISBERGER, LINCHENG WANG, KUEI SUN, CHUANWEI ZHANG, University of Texas at Dallas — The recent experimental realization of spin-orbit coupling for ultra-cold atomic gases provides a new powerful platform for exploring many interesting quantum phenomena. In these experiments, time-reversal symmetry is explicitly broken by the Raman coupling that corresponds to an effective Zeeman field. Here we propose that time-reversal symmetry can be restored in bilayer spin-orbit coupled ultracold atomic gases using opposite Zeeman field in two layers, which can be realized easily in experiments. We study the ground phase diagram of such time-reversal invariant BEC and explore the important role of layer-spin coupling.

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