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**Large Chern number topological superfluids in bilayer system** MING GONG, BEIBING HUANG, The Chinese University of Hong Kong, GONG TEAM — We investigate the topological phase transition with large Chern number in a coupled layer system. The topological transitions between different topological superfluids can be realized by controlling the binding energy, interlay tunneling and layer asymmetry *etc*. These topological phase transitions can be characterized by energy gap closing and reopening at the critical points at zero momentum, where the Pfaffian and Chern number undergo a discontinuous change. The bulk-edge correspondence ensures that the number of edge modes exactly equals the Chern number. However all these edge modes localized at the same edge have the same chirality and propagate along the same direction. These topological phases can be detected by spin texture at or near zero momentum, which changes discontinuously across the phase transition point due to band inversion. This model can be easily generalized to multilayer system in which the Chern number equals any positive integer — similar to that in integer quantum Hall effect — can be realized. This work paves a new way in the realization of topological superfluids with large Chern number.

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