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Non-perturbative approach to the quantum Hall bilayer MILICA MILOVANOVIC, ZLATKO PAPIC, Institute of Physics, Belgrade — We study the disordering of the superfluid phase in the quantum Hall bilayer at the filling factor one with increasing distance between the layers. We find that the possibilities for ground state wave functions that describe the superfluid at an arbitrary distance fall into two universality classes. They correspond to (1) Berezinskii-Kosterlitz-Thouless (BKT) (2D XY) model of superfluid disordering in the presence of charged impurities and (2) λ transition (3D XY) model in a translatory invariant quantum Hall bilayer system. The BKT type of disordering likely ends with unbinding of created pairs of neutral fermionic vortices (in a transition reminiscent of the one reported in Champagne et al.). In the translatory invariant system the ensuing quantum phase transition proceeds via condensation of loops of elementary charged vortices - merons into a topological phase associated with the toric code model.

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