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Interlayer pairing symmetry of composite fermions in quantum Hall bilayers HIROKI ISOBE, LIANG FU, Massachusetts Institute of Technology — We study the pairing symmetry of the interlayer paired state of composite fermions in quantum Hall bilayers. In such systems, quantized Hall conductances are observed when each layer is at even-denominator filling fractions. For short layer distances, the incompressible phase is dictated by the formation of an excitonic superfluid phase. In contrast, at larger distance, the bilayer system is described by two composite Fermi liquids with interlayer interactions. Based on the Halperin-Lee-Read (HLR) theory, we analyze the effect of the long-range Coulomb interaction and the internal Chern-Simons gauge fluctuation with the random-phase approximation beyond the leading order contribution in small momentum expansion, and observe that the interlayer paired states with a relative angular momentum $l = +1$ is energetically favored for filling $\nu = \frac{1}{2} + \frac{1}{2}$ and $\frac{1}{4} + \frac{1}{4}$. The degeneracy between states with $\pm l$ is lifted by the interlayer density-current interaction arising from the interplay of the long-range Coulomb interaction and the Chern-Simons term in the HLR theory.
Reference: H. Isobe and L. Fu, arXiv:1609.09063.

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