Numerical study on the 5/2 fractional quantum Hall states

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I will present a comprehensive numerical study of a microscopic model of the 5/2 fractional quantum Hall system with Coulomb interaction and a semi-realistic confining potential based on the disc geometry. The talk will concentrate on the stability of the ground state, charged +e/4 quasihole excitations, and edge excitations. In particular, the evolution of edge spectrum of the Moore-Read-like state allows us to distinguish the charge and neutral edge modes, which turn out to have very different velocities. This separation of velocities can lead to decoherence for a non-Abelian quasihole/quasiparticle (with charge $\pm e/4$) when propagating along the edge. A realistic set of parameters set the upper bound for the decoherence length, so the limit on the separation of the two point contacts in a double point contact interferometer for the detection of non-Abelian statistics, to be around 4 microns.