Session 26W

Josephson-like Tunneling and Quantized Hall Drag in an Excitonic Condensate **26W1**

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When two parallel 2D electron gases are sufficiently close together, interlayer Coulomb interactions are of comparable importance to intralayer ones. If the total number of electrons in the bilayer system equals the number of states in the lowest spin-resolved Landau level produced by a large perpendicular magnetic field, an exotic many-body state develops. This state exhibits a variety of remarkable properties including Josephson-like interlayer tunneling and precise quantization of the frictional drag between the layers. These findings lend strong support to the notion that this quantum coherent state is an example of a new kind of superfluid, one in which the underlying bosons are excitons comprised of electrons in one layer bound to holes in the other. This work is supported by the NSF and the DOE.

Spins and Interactions in Semiconductor Double Dot Systems **26W2**

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I present experimental studies of spin effects in a weakly and strongly coupled two quantum dot systems. A weakly coupled two dot system holding two electrons is a good analogue to a two-site Hubbard model. We observe novel spin blockade in line with the Pauli exclusion as a typical feature of the Hubbard model, and the lifting of the blockade due to the hyperfine coupling to nuclear spins. For a similar but more strongly coupled two dot system, the electronic state is delocalized, either a spin singlet or a triplet. These spin states are energetically separated by the exchange energy, which is tunable with the strength of tunnel coupling and interactions. I discuss the tunability of the exchange coupling and also the ability of such a double dot system for implementing quantum computation.