Abstract Submitted
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Spin Mixing in GaAs Quantum Wells[1] WILLIAM MAYER, City College of New York, Graduate Center CUNY, AREG GHAZARYAN, POUYAN GHAEMI, SERGEY VITKALOV, City College of New York, ALEXEY BYKOV, Institute of Semiconductor Physics, Russia — Transport properties of highly mobile 2D electrons are studied in symmetric GaAs quantum wells placed in titled magnetic fields. Quantum positive magnetoresistance (QPMR) is observed in magnetic fields perpendicular to the 2D layer. Application of in-plane magnetic field produces a dramatic decrease of the QPMR. This decrease correlates strongly with the reduction of the amplitude of Shubnikov de Haas resistance oscillations due to modification of the electron spectrum via enhanced Zeeman splitting. Surprisingly no quantization of the spectrum is detected when the Zeeman energy exceeds the half of the cyclotron energy suggesting an abrupt transformation of the electron spin-orbital dynamics. Observed angular evolution of QPMR implies strong mixing between spin subbands. Theoretical estimations indicate that in the presence of spin-orbital interaction the elastic impurity scattering provides significant contribution to the spin mixing in GaAs quantum wells at high filling factors.

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Sergey Vitkalov
City College of CUNY

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