Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Interaction effect on quantum magnetooscillations in a two-dimensional electron gas YURY ADAMOV, BNL, IGOR' GORNYI, Institut fuer Nanotechnologie(INT),Forschungszentrum Karlsruhe, Karlsruhe, Germany, ALEXANDER MIRLIN, Universitaet Karlsruhe and INT, FZK, Karlsruhe, Germany — Recently there is considerable experimental interest in the semiconductor systems with apparent quantum phase transition. For this experiments it is important to have independed means of measurements of effective electron mass. This mass can be inferred from quantum magnetic oscillations, and we present a framework for the interpretation of magnetooscillation experiments. We consider the effects of interactions and disorder on the damping of magneto-oscillations in 2D. We study the effect of both long range and short range interaction and point-like disorder in a ballistic ($T\tau \gg 1$) and diffusive ($T\tau \ll 1$) regime, where τ is mean scattering time. The dominant effect on the damping comes from interplay of disorder and interaction corrections to to the electron mass. Depending on the nature of interaction we found the corrections to behave like $\ln T$ and $\ln^2 T$ in the ballistic and diffusive regime correspondendly.

Yury Adamov
Brookhaven National Lab (BNL)

Date submitted: 08 Dec 2004 Electronic form version 1.4