**Shubnikov–de Haas Oscillations in a 2D Electron Gas Under Subterahertz Radiation**

Shi, Q.; Martin, P.D.; Hatke, A.T.; Zudov, M.A. (U. of Minnesota, Physics); Watson, J.D.; Gardner, G.C.; Manfra, M.J. (Purdue U., Physics); Pfeiffer, L.N. and West, K.W. (Princeton U., Electrical Engineering)

**Introduction**

 When a 2D electron gas (2DEG) is subject to subterahertz radiation and low temperature, its magneto-resistivity exhibits, simultaneously, both Shubnikov-de de Haas oscillations (SdHO) and microwave-induced resistance oscillations (MIRO) [1]. Different theoretical predictions exist on how the SdHO amplitude should be affected by radiation [2]. Here, we report on experimental studies [3] which contradict existing theories.

**Experimental**

 Our samples are Hall bars fabricated from GaAs/AlGaAs quantum wells with the density 3.1 x 1011 (2.6 x 1011) cm-2 and the mobility 3.6 x 106 (2.1 x 107) cm2/Vs. Measurements were performed in SCM-2 and subterahertz radiation was generated by backward-wave oscillators.

**Results and Discussion**

 In Fig. 1(b) we present normalized radiation-induced correction to the SdHO amplitude, $δA\_{ω}/A\_{0}$, along with normalized MIRO amplitude$ δρ\_{MIRO}/(2πϵλ^{2}ρ\_{0})$, both obtained from magnetoresistivity shown in Fig. 1(a), as a function of $ϵ=ω/ω\_{c}$, where $ω$ and $ω\_{c}$ are the radiation and cyclotron frequencies, respectively. Remarkably, both quantities show excellent agreement in the period and phase, in contrast to theoretical predictions [2]. Even more surprising is the astonishing agreement between the amplitudes of the two quantities (no adjustable parameters have been used).



**Fig. 1** (a) $ρ(B) $at $f $= 378 GHz and $T$= 0.32 K. (b) $δAω/A$ and $δρ/(2πϵλ^{2}ρ\_{0})$ versus $ϵ=ω/ω\_{c}$.

**Conclusions**

 We obtain an empirical relation for the radiation-induced correction to the SdHO amplitude, which is reminiscent of MIRO. The observed correlation between MIRO and SdHO calls for further studies.

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