Effect of a tilted magnetic field on radiation-induced zero resistance states and resistance oscillations in a 2DEG

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Recent experiments [1] show an unbalanced quenching of the radiation-induced resistance oscillations for increasing tilted magnetic field and tilt angle. Another effect is that this increasing field makes the zero resistance states to disappear. We present a theoretical model which explains these results based in a common physical mechanism. The theoretical framework is the microwave-driven electron orbits model [2]. According to the model the key point is that the parallel component of the tilted magnetic field, ($B\ sin(\theta)$), makes the electron confinement stronger in the *z*-direction (perpendicular to the 2DEG). As a result the interaction of radiation-driven electrons with acoustic phonons increases making much easier the release of radiation energy to the lattice. The main outcome of this is that the radiation-induced resistance oscillations are increasingly damped. The calculated results are in good agreement with experiments. The understanding of this behavior will allow to control the transport properties in a MW irradiated Hall bar.

[1] A. Bogan et al., Phys. Rev. B, 86, 235305 (2013).
[2] Jesus Inarrea et al., Phys. Rev. Lett., 94, 016806 (2005).

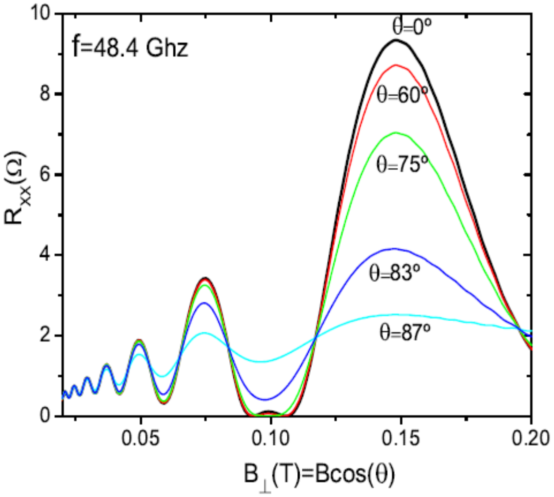

Figure 1