

Abstract Submitted  
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**Beating of Friedel Oscillations in Spin-Orbit Coupled System<sup>1</sup>**

SAMVEL BADALYAN, Department of Physics, University of Regensburg, 93040 Regensburg, Germany, ALEX MATOS-ABIAGUE, University of Regensburg, GIOVANNI VIGNALE, Department of Physics and Astronomy, University of Missouri, Columbia, Missouri 65211, USA, JAROSLAV FABIAN, Department of Physics, University of Regensburg, 93040 Regensburg, Germany — The interplay of different spin-orbit interaction mechanisms induces highly anisotropic modifications of the static dielectric function of a two-dimensional electron system. One of the main changes of the static polarization function is the induced shift of its singularity position, which is in opposite directions for orthogonal momentum orientations. More interestingly, we have found that in certain situations the polarization function exhibits a *doubly-singular* behavior. This new property generates a novel phenomenon—the *beating of Friedel oscillations*, which can be controlled by an external electric field. This effect is a general feature of systems with Bychkov-Rashba and Dresselhaus spin-orbit fields and should be directly observable through tunneling microscopy imaging of the density distribution around an impurity.

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