Kolloquium

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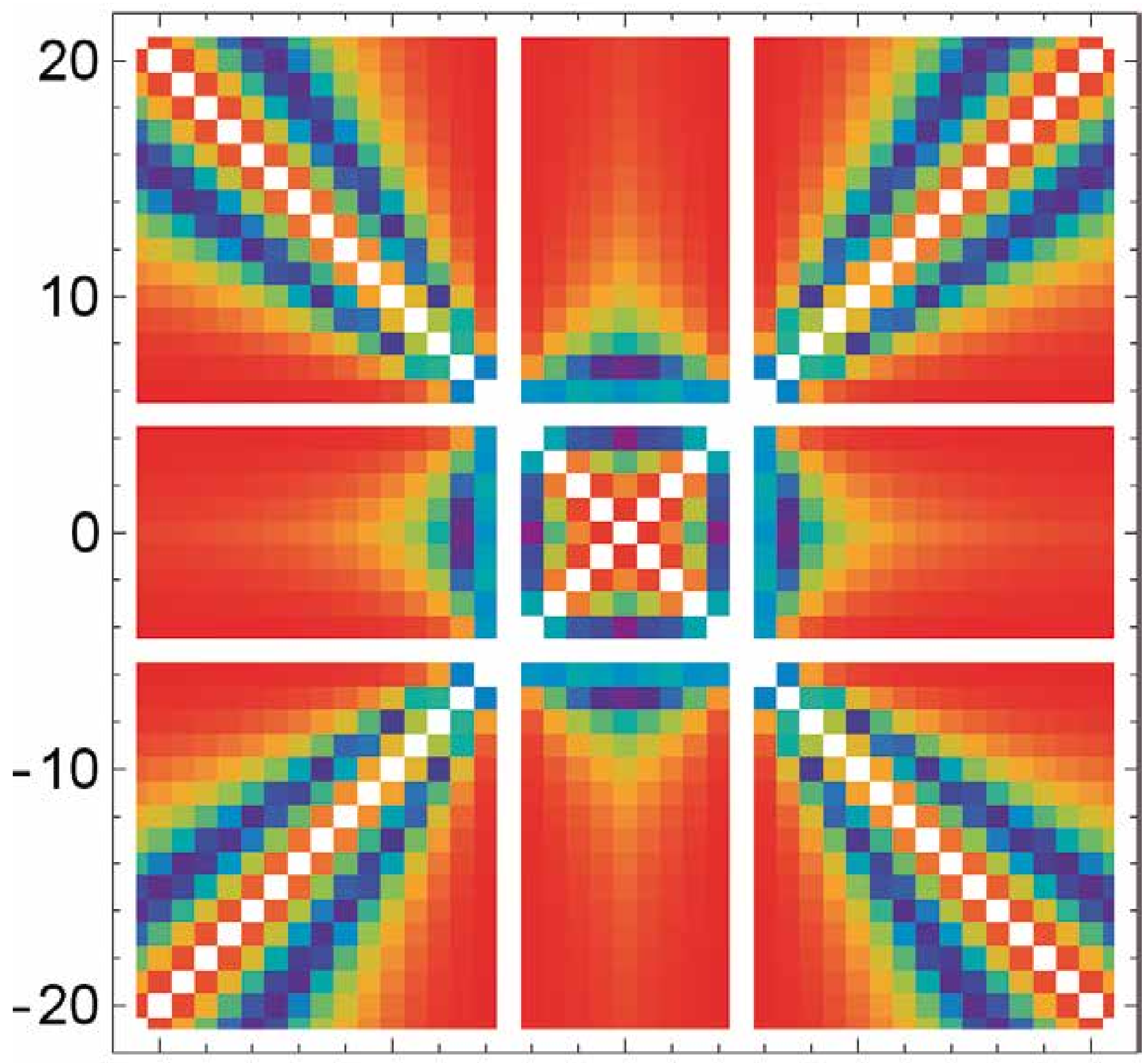
Spintronics: Taming spin relaxation

physikalisches

Mo. 09.01.17
16:00 Uhr
Ort: H34

Although Datta and Das came up with the idea of a spin field-effect transistor already 1990, realizing it is still a challenge. A spintronic device relies on coherent spin precession of carriers which can be manipulated via the spin- orbit coupling. However, at the same time the latter generates spin relaxation due to impurities in the device. In this talk I would like to show how spin relaxation can be minimized and what conductivity measurements [2] can tell us about it.
Thereby, I will focus on our latest investigation on spin-preserving symmetries due to the interplay of Rashba and Dresselhaus spin-orbit coupling in n-doped zinc-blende semiconductor quantum wells.[1] A generalization of their growth direction reveals new insight into a rather well known problem. Furthermore, the effect of the wire geometry will be discussed, more precisely, the spin-orbit coupling and spin relaxation in nanorods.

[1] M. Kammermeier, P. Wenk, J. Schliemann, Phys. Rev. Lett. 117, 236801 (2016)
[2] K. Yoshizumi, A. Sasaki, M. Kohda, J. Nitta, Appl. Phys. Lett. 108, 132402 (2016).
[3] M. Kammermeier P. Wenk, J. Schliemann, Sebastian Heedt, Thomas Schäpers, Phys. Rev. B 93, 205306 (2016)



Above: Ratio between the global spin relaxation rate minimum and the rate at vanishing wave vectors of spin density in zinc-blende type 2DEGs as a function of Miller indices. White regions indicate persistent spin helix solutions. Phys. Rev. Lett. 117, 236801 (2016)

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