HL 30: Invited talk Fomin

Time: Wednesday 12:15–12:45 Location: H33

Invited Talk HL 30.1 Wed 12:15 H33

Topology−driven excitonic Aharonov−Bohm effect in core−multishell nanowires — •Vladimir M. Fomin[1], Pierre Corfdir[2], Oliver Marquardt[3], Ryan B. Lewis[2], Chiara Sinito[2], Manfred Ramsteiner[2], Achim Trampert[2], Uwe Jahn[2], Lutz Geelhaar[2], and Oliver Brandt[2] — [1]Institute für Integrative Nanowissenschaften, Leibniz IFW Dresden, Dresden D-01069, Germany — [2]Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im FVB, D-10117 Berlin, Germany — [3]Weierstraß-Institut für Angewandte Analysis und Stochastik, Leibniz-Institut im FVB, D-10117 Berlin, Germany

The physics of quantum rings is a heuristically unique playground for topology-driven quantum-mechanical effects [1]. A novel insight in this field is achieved by extending the paradigm of topology-controlled properties from quantum rings onto a broad class of doubly-connected nanoarchitectures. Core-multishell GaAs/AlAs nanowires are shown to be an excellent platform for investigations of the Aharonov−Bohm effect of neutral and charged excitons [2]. The controlled fabrication of nearly perfect quantum rings in core-multishell GaAs/AlAs nanowires is ensured by combining all-binary radial heterostructures with axial crystal-phase quantum structures. Excitonic phase coherence is predicted theoretically and observed through the Aharonov−Bohm oscillations in the photoluminescence spectra in quantum rings with circumferences as large as 200 nm. [1] V. M. Fomin (Ed.), Physics of Quantum Rings, 2nd Edition (Springer International Publ., Cham, 2018), 586 p. [2] P. Corfdir et al., Adv. Mater. 31, 1805645 (2019).