



Experimentelle
Physik 2

Seminar Festkörperphysik (CMP Seminar)

Aktuelle Probleme der Festkörperphysik für Studenten und Mitarbeiter
020236 Kolloquium/Seminar SS 25

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Spatially indirect excitons as a probe for inter-valley coupling in GaAs/AlAs quantum dots

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We study single GaAs/AlAs quantum dots supporting type-II indirect excitons, exhibiting strong interaction with external electric fields through their static dipole moment and wide tunability of their energetic properties. We evidence coherent coupling between electrons confined in the GaAs Γ -valley and AlAs X-valley through hybridization between direct and indirect excitons confined in the quantum dot using Stark spectroscopy. The presence of two distinct anticrossings at different electric fields on the neutral exciton emission line shows tunability of the indirect exciton dipole orientation through electric field control. The indirect states exhibit anomalous g-factors and diamagnetic coefficients when optically probed under a magnetic field, further confirming the involvement of barrier-localized states.