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【532】 k-resolved electronic structure of quantum heterostructure and impurity systems by soft X-Ray ARPES

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Soft-X-ray ARPES in photon-energy range around 1 keV combines electron-momentum resolution with large photoelectron escape depth, allowing studies of buried heterostructures and impurities. For example, experiments on AlGaN/GaN find anisotropy of the interfacial states, propagating to electron transport [Nature Comm. 9 (2018) 2653]. For LaAlO₃/SrTiO₃, resonant photoexcitation of Ti-derived interfacial charge carriers resolves their multiphonon polaronic nature [Nature Comm. 7 (2016) 10386]. The NbN/GaN heterostructures show the NbN-derived Fermi states well separated from GaN in energy and momentum, protecting superconductivity [Sci. Adv. 7 (2021) eabi5833]. Resonant photoexcitation of the magnetic Fe impurity states in In(Fe)As identifies their integration into InAs, allowing high electron mobility [Phys. Rev. B 103 (2021) 115111].

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