

O 44 Hauptvortrag Ristein

Zeit: Dienstag 14:45–15:30

Raum: TU EB301

Hauptvortrag

O 44.1 Di 14:45 TU EB301

Diamond surfaces: familiar and amazing — ●JÜRGEN RISTEIN —
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Diamond is the only wide band gap representative of the elemental semiconductors, with a crystal structure identical to its more common relatives silicon and germanium. On first glance one might expect also similar surface properties in terms of reconstructions, surface states and surface band diagrams. In part this expectation is indeed fulfilled, but diamond also exhibits a number of unusual and potentially very useful surface properties. Particularly when the surface dangling bonds are saturated by monovalent hydrogen atoms, (donor-like) surface states are removed from the gap, the electron affinity changes sign and becomes negative, and the material becomes susceptible to an unusual type of transfer doping where holes are injected by acceptors located at the surface instead of inside the host lattice. These surface acceptors can in the simplest case be adsorbed molecules conveniently chosen by their electron affinity, but they can also be solvated ions within atmospheric water layers or electrolytes in contact with the hydrogenated diamond surface. The understanding of those phenomena requires in fact concepts of surface science, semiconductor physics and electrochemistry, which makes the diamond surface a true 'interdisciplinary' research topic.