

Probing single nanowires with a hard X-ray nanobeam

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Nano X-ray beams are emerging characterization tools with broad implications for semiconductor research. Here we describe how a hard nanometre-sized X-ray beam is used today using reflective optics at the beamline ID22 of the European Synchrotron Radiation Facility to study size-dependent phenomena in single semiconducting nanowires. We show that X-ray microscopy is a key approach for space-resolved determination of structural and time-resolved electronic properties, and for chemical speciation of magnetic doped nanowires, core/multishell heterostructures and crossed nanowire architectures. Selected examples will range from cluster formation to particle contaminations and dopant segregation effects, to phase separations, carrier confinement effects and embedded junction domains.