



Sonderforschungsbereich 631
Festkörperbasierte Quanteninformationsverarbeitung



SEMINARANKÜNDIGUNG

Dienstag, 11. Dezember 2007

17:15 Uhr

WSI, Seminarraum S 101

“ Germanium nanocrystals synthesized by ion beams ”

Germanium nanocrystals with an average radius of 2.5 nm have been synthesized using ion implantation into SiO₂ followed by thermal annealing, i.e., traditional silicon integrated circuit technologies. The isotopically pure Ge nanocrystals can be investigated by optical spectroscopies. Raman spectroscopy shows that the nanocrystals are stressed, a consequence of the 4.6 % volume expansion upon solidification. The stress can be relieved through prolonged annealing or through liberation from the SiO₂ matrix by HF etching. A large melting – freezing hysteresis centered around the bulk melting point is observed for SiO₂ embedded nanocrystals, a phenomenon that can be modeled with a kinetic theory. Visible light induced photo oxidation is observed and interpreted with an electron active oxygen dissociation process followed by oxygen diffusion to the interface. The first Ge-Metal, strongly segregating alloy nanocrystals, have been formed. They offer a broad spectrum of possible nanostructures. In case the size distribution of ion implantation synthesized nanocrystals can be reduced to a few % several IT applications will become very attractive.

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