

Track formation and fabrication of nanostructures with MeV-ion beams

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The state-of-art of nanometric amorphization of materials induced by dense electronic excitations of swift heavy ions will be presented. A detailed description of the experimental track observations will show that swift heavy ions are very efficient to induce phase transformations in a cylinder of some nanometers. The correlation between the track formations and chemical and physical property changes of the irradiated materials will be described, in particular on the creation of tracks with ferromagnetic properties, conducting tracks in insulators, change of the geometrical shape of matrix-embedded nanoparticles, lithography with high aspect ratio and etching of nanochannels suitable as templates for growth of monoatomic or multilayered metallic nanowires. It is suggested that such applications could be performed at smaller accelerators delivering ion beams at some tens of MeV around the masses 100.