

Fine Structure in Swift Heavy Ion Tracks in Amorphous SiO₂

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We report on the observation of a fine structure in ion tracks in amorphous SiO₂ using small angle x-ray scattering measurements. Tracks were generated by high energy ion irradiation with Au and Xe between 27 MeV and 1.43 GeV. In agreement with molecular dynamics simulations, the tracks consist of a core characterized by a significant density deficit compared to unirradiated material, surrounded by a high density shell. The structure is consistent with a frozen-in pressure wave originating from the center of the ion track as a result of a thermal spike.