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Spatially resolved X-ray spectroscopy of swift heavy ions – solid matter interaction S.A. PIKUZ JR., O. ROSMEJ, A.YA. FAENOV, V.P. EFREMOV, S. KOROSTIY, A. BLAZEVIC, A. FERTMAN, I.YU. SKOBELEV, G.E. NORMAN, D.H.H. HOFFMANN — K-shell radiation of projectile ions and solid media during its interaction has been investigated. The target media are transparent for radiation applied for diagnostics, which provides the data acquisition directly from the interaction volume. The projectile and target spectra in the energy range of 1.5−8 keV were registered by spherically bend crystal spectrometers (FSSR) with a high spatial resolution along the beam propagation. The Ni, Ca and Mg ions accelerated in GSI UNILAC facility to the energies of 11.4 MeV/u were slowed down in quartz and aluminum media. Low-density (up to 0.02 g/cc) quartz aerogel targets allowed expanding 100 times the interaction volume and to determine the evolution of ion beam velocity and charge states inside the media. At the same time, the wavelengths and relative intensities of K_α satellite lines radiated by Si and Al target ions with different charges were measured. This has been provided us to investigate the excited media of the heavy ion track on a timescale of radiation transitions lifetimes (∼10 fs after excitation). Low beam current of 1 uA allowed us to consider the excitation process as a number of statistically independent acts of single heavy ion energy deposition to the media. Non-stationary radiation kinetics simulations was applied to analyze excited media experimental spectra and to recognize the conditions of initial stage of single ion track formation.

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