Abstract Submitted for the DAMOP13 Meeting of The American Physical Society

Polarization bremsstrahlung of fast ions on a multi-atomic chain MIRON YA. AMUSIA, Racah Institute of Physics, Hebrew University, Jerualem, Isrtaek and Ioffe Institute of physics, St. Petersburg, Russia, VICTOR I. MATVEEV, Lomonosov Northern (Arctic) Federal University, Arkhangelsk, RUSSIA — We have considered the Polarization or Atomic Bremsstrahlung (AB) [1] generated in the process of scattering of a fast charge particle on a linear chain of isolated atoms. The specific feature of AB is that the radiation is generated by the varying in direction and size dipole moment induced in the target atom by the incoming projectile. In case of multi-atomic targets, one must take into account that the projectile interacts with several atoms simultaneously, inducing a common time-dependent dipole moment. As a concrete target, we choose a linear chain of equally spaced atom with interatomic distance d. Using the approach developed in [2] for ion-chain scattering, we obtained intensity and angular distribution of the polarization bremsstrahlung spectrum for arbitrary number Nof atoms in the chain. We demonstrate that the interference of photon radiation amplitudes leads to impressive alteration of the spectral angular distributions of AB on the target atomic chain as compared to that on an isolated atom. The result allows generalization for the cases when the target is a plane formed of chains. Of special interest is the case when chains form a tube.

Essential difference is expected when the projectile goes inside and outside this tube.

- [1] M. Ya. Amusia, Radiation Physics and Chemistry, 75, 1232, 2006.
- [2] V. I. Matveev and D. U. Matrasulov, JETP Letters, 96, 700, 2012

Miron Amusia Retired

Date submitted: 29 Jan 2013 Electronic form version 1.4