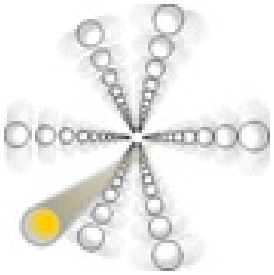

Contribution ID: **34** Type: **not specified**

Line Spectra of Electromagnetic Radiation from Relativistic Nuclei Passing through Matter

Monday, 24 September 2012 10:30 (15 minutes)

When the relativistic nucleus penetrates through a matter, besides nuclear reactions the relativistic Coulomb excitation of projectile nucleus occurs. The de-excitation results in emission of electromagnetic radiation, characterized by continuous spectrum with broad maximum in the case of Coulomb excitation to giant dipole resonance (A.Sorensen, Channeling-2010). If the separate nuclear levels of relativistic projectile nucleus are excited, one may expect not continuous but line spectra of electromagnetic radiation from these nuclei. Here, we report on the first calculations of emission line spectra from light and heavy relativistic nuclei at FAIR, SPS and LHC energies, based on the theory of relativistic Coulomb excitation in collisions of relativistic bare nuclei with target atoms. The experimental schemes to observe the emission line spectra from relativistic nuclei penetrating through solid targets are discussed, as well as their relevance to be the new tool for nuclear spectroscopy, especially for exotic short-lived isotopes.

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Session Classification: S1.1 Coherent Bremsstrahlung

Track Classification: Coherent Bremsstrahlung