

Dottorato di Ricerca in Fisica dell'Università degli Studi di Messina

13 Aprile 2012, ore 15.00, Aula E. Majorana, Dip.to di Fisica,

V.le F. Stagno d'Alcontres 31, S. Agata, Messina

Seminar title:

Recent development of Ion sources Science & Technology at INFNLNS, Catania

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Abstract

The Ion Source R&D Team at INFN-LNS, Catania, has proposed in the last twenty years a great deal of new concepts for the development of Ion sources Science & Technology. The last ones are the Frequency Tuning Effects in ECR ion sources and the OXB transition to overdense plasmas in Microwave Discharge Ion Sources. These developments have been applied to different accelerators' design in Europe and USA, which will be described in the following.

The frequency tuning effects is hereby summarized: according to the model that has driven the development of ECRIS in the last years, a large variation of the pumping microwave frequency (order of GHz) along with the proportional increase of the magnetic field boosts the extracted current for each charge state because of a larger plasma density. Recent experiments have demonstrated that even slight frequency's changes (of the order of MHz) considerably influence the output current, and what's more important, even the extracted beam properties (beam shape, brightness and emittance) are affected.

The OXB transition consists of the triggering an electrostatic wave in a plasma generated by ECR discharge, avoiding in such a way the limitation of the cut-off density. The application of these concepts to the accelerator design of the European Spallation Source Linac and of the DAEDALUS project in USA will be described with a few details.