

Training workshop on ECR charge breeder techniques

Place: LPSC, 53 Avenue des Martyrs, 38 GRENOBLE, FRANCE

Duration: 2 days

Maximum participants: 4

Description

The participants will gain practical knowledge about the ECR charge breeding technics. In this method, the implementation of two beam lines and two ion sources is necessary. During the training, the development methods used to design and improve the 1+ sources, the beam diagnostics (including the Allison type emittance meters), the beam optics devices and the Charge Breeder (CB) will be presented. The presentation will lean on the simulations used for the microwave, magnetic field and ion beam domains. The hands on training will also focus on the beam capture and the measurements done to qualify the process: efficiency measurement, charge breeding time, charge state distribution, deltaV curve for gaseous or alkali ions.

The participants will actively switch on the test bench, tune the optics and the parameters to improve the efficiency. They will use the beam diagnostics and make the specific charge breeding measurements.

After the training, he/she should understand the principle of the charge breeding method.

Plan of activities

First day: The participants will attend an introductory seminar about the objective of the training, about the ISOL method, about the devices used on a charge breeding test bench, and more specifically the LPSC ones (ion sources, diagnostics, optics) and about the charge breeding process. Then they will get the safety instructions mandatory to work in the test area. The participants will start the 1+ source and measure the 1+ emittances using Allison type emittance meters.

Second day: The participants will switch on the test bench, they will start both 1+ and CB ion sources. Then they will inject the 1+ beam in the Charge Breeder and optimize the parameters to improve the efficiency of one charge state. They will make comparative measurements changing one parameter (1+ ion beam current, support gas...) and analyze the results.