

# GFA and SwissFEL Accelerator Seminar

## A MULTI MEGAWATT RING CYCLOTRON TO SEARCH FOR CP VIOLATION IN THE NEUTRINO SECTOR

Monday, September 26<sup>th</sup>, 16.00 h, WBGB/019

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A new approach to search for CP violation in the neutrino sector is proposed by the experiment called DAE $\delta$ ALUS (Decay At rest Experiment for  $\delta_{cp}$  At Laboratory for Underground Science). DAE $\delta$ ALUS needs three sources of neutrino fluxes, each one located at 1.5, 8 and 20 km from the underground detector. Each source has to be supplied with a proton beam with power higher than 1, 2 and 5 MW respectively.

The study for a Superconducting Ring Cyclotron able to accelerate the  $H_2^+$  molecules and to deliver proton beam with maximum energy of 800 MeV and the required power, will be presented.

Although the average power for the first 2 sites are 1 and 2 MW, the 20% duty cycle, required by the experiment, has the consequence that the peak power should stay in the range 5-10 MW and a peak current of about 4.5 mA of  $H_2^+$  is necessary. The description of superconducting magnetic sector simulated by the code TOSCA, the isochronous magnetic field produced and the magnetic forces acting on the coils, will be discussed. Some evaluation on the feasibility of the ring cyclotron, the advantages and problems relates with acceleration of the  $H_2^+$  molecules, and the main features of an injector cyclotron will be also presented.

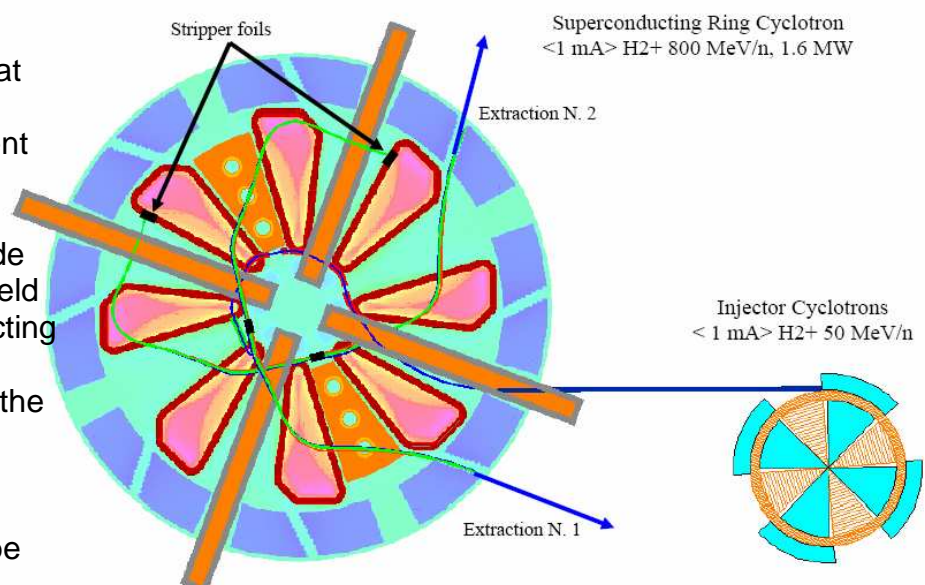


Fig. 1.1: Layout of the accelerator complex, the average beam current in figure is evaluated with a 20% duty cycle. Two stripper foils are used to achieve two extraction trajectories.

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