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The Compact Injector Cyclotron For DAEdALUS Experiment

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The experiment DAEdALUS, proposed by MIT scientist to search for CP violation in the neutrino sector, needs three accelerators with energy of about 800 MeV, average power of some MW and duty cycle of 20%. To reduce the cost of the accelerators a cyclotron complex consisting of an injector and of a booster ring cyclotron has been proposed.

Due to the low duty cycle, the peak current to be accelerated is 5 mA. The problem related to the injection of a H₂⁺ beam, delivered by a compact ion source, and to the space charge effects will be discussed. To reduce the cost a solution based on a compact cyclotron is proposed and this poses a limit to the maximum energy of the H₂⁺ beam. Two cyclotron models have been simulated, one with a pole gap of 10 cm and another with 6 cm gap. For both cases the beam extraction is performed by electrostatic deflectors. The main characteristics of the Daedalus injector cyclotron, able to accelerate a H₂⁺ molecule beam up to 60 MeV/n, the magnetic configuration, the isochronous magnetic field and beam dynamics during the acceleration, with and without space charge effects, and along the extraction path will be presented, too.

Please indicate preferred presentation (poster or talk?)

talk

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