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High intensity problems study on the H₂⁺ cyclotrons for the DAEdALUS project

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In the DAE δ ALUS (Decay-At-rest Experiment for δ_{CP} studies At the Laboratory for Underground Science) project, ultra-high power proton cyclotrons are proposed, which should efficiently provide the necessary proton beams in the range of 1 to 8 MW with a kinetic energy up to 800 MeV.

The evaluation of space charge effects are challenging, for both the injector cyclotron (DIC) and the main ring cyclotron (DSRC).

We report on precise calculations w.r.t. high intensity problems for both machines. Large scale particle simulations show, that in the current design, the beam losses are associated to the single turn extraction in the DIC. This constitutes the bottleneck in achieving more than 5 mA of H₂⁺ beam. On the other hand, in the DSRC, with multi turn and stripping extraction, space charge plays a minor role.

Please indicate preferred presentation (poster or talk?)

talk

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