

## Studies Progress of the High Intensity H<sub>2</sub><sup>+</sup> Cyclotrons for DAE $\delta$ ALUS and IsoDAR Projects

The DAE $\delta$ ALUS (Decay-At-rest Experiment for CP studies At the Laboratory for Underground Science) project has been proposed to measure the value of the CP violating phase through the oscillation of muon antineutrinos to electron antineutrinos. In this project, high intensity H<sub>2</sub><sup>+</sup> cyclotron chains are proposed to efficiently provide proton beams with a kinetic energy of 800MeV and an average power in the MW range. The 60MeV/amu high intensity injector cyclotron of DAE $\delta$ ALUS can also be used as the driver of a pure electron antineutrino source for the IsoDAR (Isotropic Decay At Rest) project. Here we will describe the recent studies progress of the injector cyclotron and the main ring cyclotron development. We also report the results of experimental tests on the ion source, injection line and the central region that are under way. These tests aim to answer some critical questions concerning high intensity H<sub>2</sub><sup>+</sup> beam generating, separating and cooling.

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