

CONCEPTUAL DESIGN OF A 56 GHZ ECR ION SOURCE MAGNET STRUCTURE

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Abstract

The development of a 4th Generation ECR ion source, which could operate at 56 GHz twice that of 3rd Generation sources, presents several technical challenges.* The greatest challenge is to produce a magnet structure with sufficient field strength to adequately confine the plasma. A design study is underway to determine the feasibility and engineering issues associated with a magnet structure that could produce 8 T at injection, 6 T at extraction and 4 T radially. The initial analysis shows that peak fields in the superconductor would be roughly 12 to 14 T and this is above B_{c2} for NbTi but less than B_{c2} for Nb₃Sn. We are evaluating two possible designs; the classic design, where the sextupole coils are placed inside the solenoids and the inverted design where the sextupole is placed outside the solenoid magnets. The preliminary results of the ongoing study are being presented and discussed.

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