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## Design of a spin rotator for the ISIS Super-MuSR beamline

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The spin rotators (SR) are DC electromagnetic devices that produce a homogeneous magnetic field to rotate the spin of the muons in flight, which is counterbalanced by a matched perpendicular electric field to avoid the bending of the muon beam trajectory. Two identical SR will be used in the new Super-MuSR beamline to rotate the muon spin by up to  $34^\circ$  per device relative to the beam direction, enabling higher transverse field muon measurements and other experiments not currently possible in the present ISIS MuSR beamline. The fundamental electromagnetic (EM) design of the SR is presented in this paper, both for the magnet and the high voltage vessel. The optimization of the electric and magnetic fields shape and strength is presented including fundamental hand calculations, 2D/3D models and particle tracking simulations. The high voltage feedthroughs and the electrode insulating supports were thoroughly designed to reduce the breakdown probability. A sensitivity study was also developed to estimate the manufacturing tolerances, but it is not presented in this paper.

### Footnotes

### Funding Agency

### Paper preparation format

Word

### Region represented

Europe

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