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Magnetic field Investigations of the ATLAS ECR Ion Sources

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A complete redesign of the ATLAS ECR2 ion source permanent magnet hexapole was completed to support 18 GHz operation, allowing for increased intensities and beam energies. This permanent magnet hexapole has since been manufactured and received. A magnetic field mapping of the hexapole was completed and compared against simulation results. Additionally, the ATLAS ECR3 has struggled with instabilities without a known cause. These beam instabilities can be tuned out but often require significant effort. A recent plasma chamber cooling water leak has given rise to an opportunity for deeper investigation of the fully permanent magnet ion source. A magnetic field mapping of the ECR3 axial and radial magnetic fields was also completed, leading to further understanding of the ion source's cause for instabilities. Updated plans for the ECR2 upgrade and the ECR3 stability improvement are described following their respective magnetic field mappings.
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