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Investigating the sealing performance of helium gas arc discharges[1] JIAN GAO, Facility for Rare Isotope Beams, Michigan State University, ANDREW LAJOIE, National Superconducting Cy- clotron Laboratory, Michigan State University, FELIX MARTI, Facility for Rare Isotope Beams, Michigan State University —

Helium gas has been proved to be a good candidate for a charge stripper applicable to the acceleration of high intensity uranium beams.[2] In order to achieve an equilibrium charge state of ions, a high pressure (around 300 *torr*) helium gas cell is desired. However, it is very challenging to maintain such a high pressure in the beam line which is under high vacuum. We are developing a recirculating helium gas charge stripper by using plasma window (PW), [3] essentially high DC arc discharges, to reduce the leakage rate to the rest of the accelerator. In this study, the pressure, velocity, and voltage field are presented to show the sealing performance of helium gas PW. In a certain current range, it shows that both the maximum gas cell pressure and the corresponding electrical conductivity increase as we increase the current for the cathodes. Our spectral diagnostics allow to study the properties of the plasma in three different directions. The size dependent sealing performance of PW has also been investigated.

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