XHV Simulation For A Transportable Cryostat

Erik Friedrich[1], José António Ferreira Somoza[2], Alexandre Obertelli[1], Frank Wienholtz[1]

[1]Institut für Kernphysik, Technische Universität Darmstadt, Darmstadt, Germany
[2]CERN, Geneva, Switzerland

Abstract

The antiProton Unstable Matter Annihilation (PUMA) project targets to study short-lived nuclei with antiprotons at CERN. The technical challenge of PUMA is to store approximately one billion antiprotons for at least a month and transport them from the ELENA low-energy antiproton ring to the ISOLDE radioactive-ion beam facility at CERN. For this long-term storage, an extremely high vacuum (XHV) of about 10−17 mbar, corresponding to a gas density about 20 cm−3, should be achieved by cryopumping. The residual gas density at XHV region depends on the molecular occupation of hydrogen on the cryogenic surface. The specificity of the PUMA experiment is that the cryopumped region should be open to the beam line for the introduction of low-energy (few keV) ions into the PUMA device. The poster will present simulations that show whether a sufficient vacuum can be achieved for at least 30 days and how the cryostat must be set up for this purpose.