Antiproton - Ion Collider for FAIR Project

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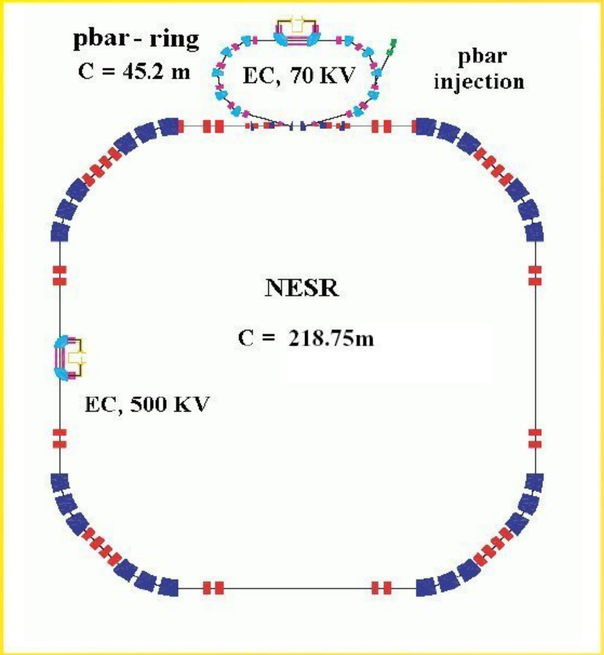
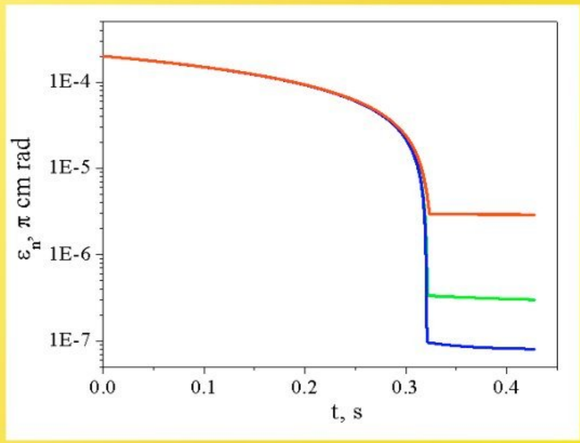
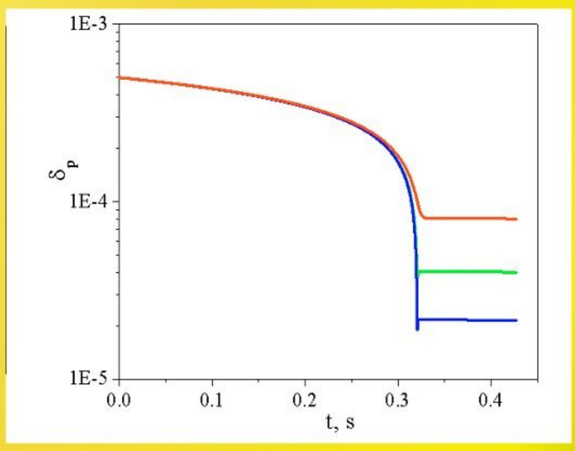


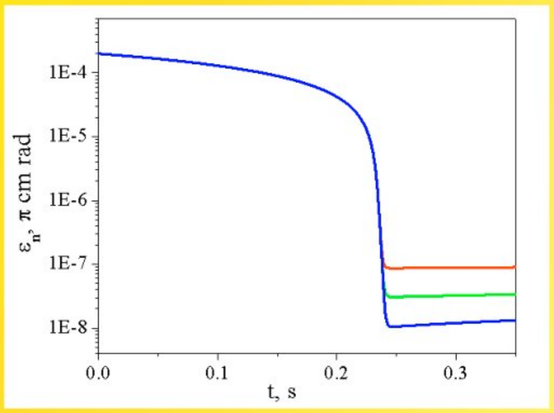
An antiproton-ion collider (AIC) is proposed to independently determine rms radii for protons and neutrons instable and short lived nuclei by means of antiproton absorption at medium energies. The experiment makes use of the electron ion collider complex with appropriate modifications of the electron ring to store, cool and collide antiprotons of 30 MeV energy with 740A MeV ions in the NESR. Antiprotons are collected, cooled and slowed to 30 MeV. Hereafter the antiprotons are transferred to the electron storage ring using a new transfer line. Radioactive nuclei are produced by projectile fragmentation and projectile fission of 1.5A GeV primary beams and separated in the Super FRS. The separated beams are transferred to the collector ring (CR) and cooled at 740A MeV and transported via the RESR to NESR, in which especially short lived nuclei are accumulated continuously to increase the luminosity.

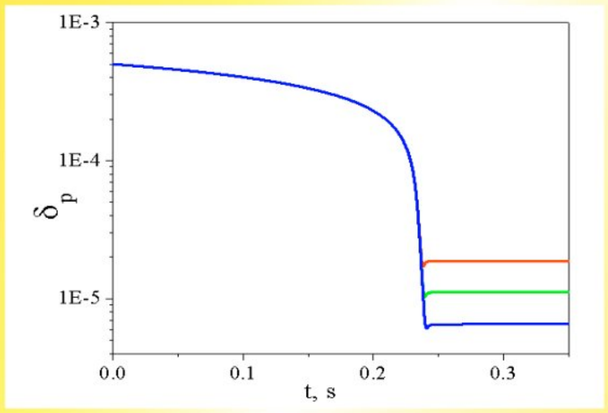
Pbar cooling in AIC, N = 10^{10}, 10^{9}, 10^{8} from top to bottom, E = 30 MeV





$^{132}Sn^{50}$ ion beam cooling in NESR, N = 10^{7}, 10^{6}, 10^{5}
Energy is 740 MeV/u





Main parameters of EC for AIC

Maximum electron energy	70 KeV
Maximum electron current	2 A
Electron beam diameter	5 - 20 mm
Magnet field in cooling section	0.2 T
Length of cooling section	3.5 m

Design Luminosity L = 10^{23} s^{-1} cm^{-2}