Proton R&D Plan

Storage Ring EDM Collaboration, May 20, 2009

10. RF-parameters (Mike Blaskiewicz)

There are two RF systems. The first is a barrier bucket system which is used to capture the beam from the AGS. Then a high frequency system with h=110 and higher voltage is turned on. The momentum spread after capture in the barrier system is $(p - p_0)/p_0 \le 0.0005$. If we capture this on harmonic 110 then the momentum spread for a bunch that fills the bucket is $(p - p_0)/p_0 \le 0.0008$ and the required voltage is 50 kV. If we choose to make the bunches half as long as the rf bucket the required voltage rises to 170kV. The high frequency system parameters are shown in the table below.

RF parameters for pEDM ring

parameter	Low voltage	System 2
Harmonic number	110	110
Frequency (MHz)	89.1	89.1
Voltage	40 kilovolts	170 kilovolts
R/Q	50 Ohm	50 Ohm
Power for Q=1000	16 kilowatt	289 kW
Synchrotron tune	0.027	0.066

From the RF power point of view both systems could be constructed using a single power amplifier and cavity. The barrier cavity system for injection still needs to be worked out. If necessary we could use an harmonic two system at low voltage fro capturing beam from AGS.