

HIGH CURRENT STORAGE RINGS FOR NEUTRAL BEAM INJECTORS

M. Cavenago¹, P. Veltri^{1,2}, G. Serianni², E. Sartori², P. Sonato², V. Antoni²

¹ INFN – LNL, viale dell'Università 2, I-35020 Legnaro (PD), Italy; ² Consorzio RFX, Corso Stati Uniti 4, I-35127 Padova, Italy

Gas neutralizer conversion ratio is limited to about 0.5. New concepts under discussion:

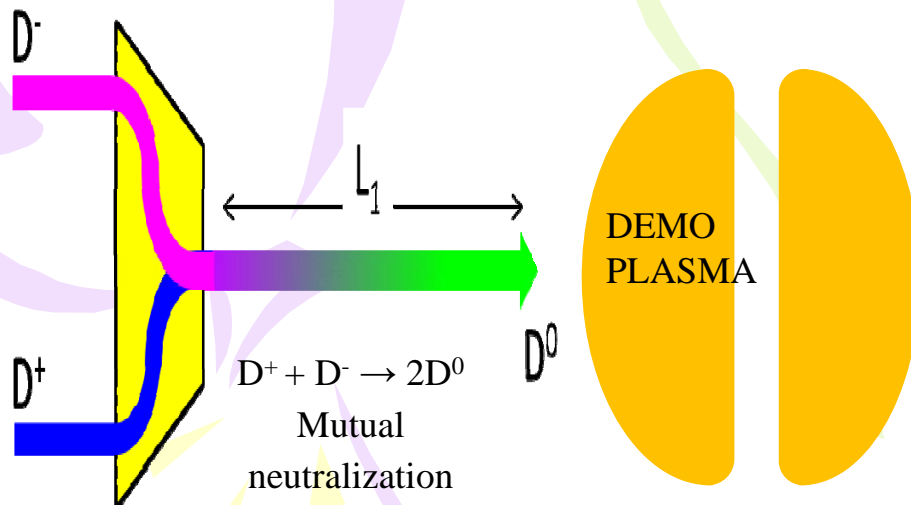
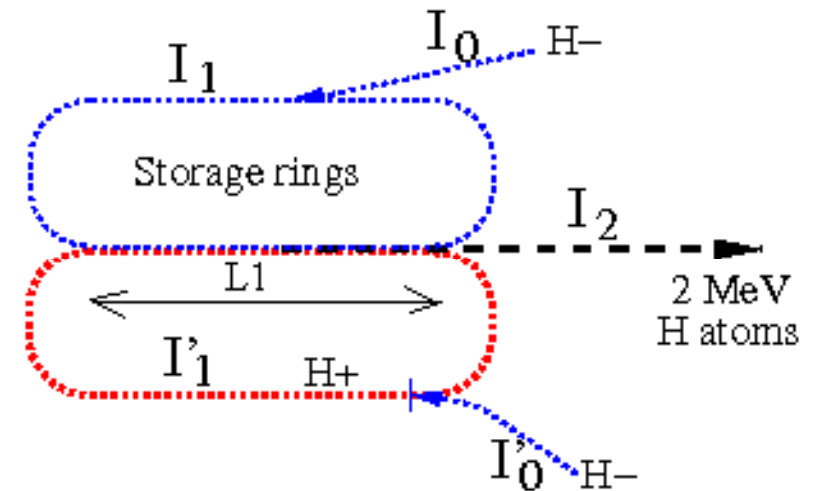


Figure 1: Comoving beam neutralizer.
Conversion efficiency near 100 % may be obtained, but with L_1 about 300 m at typical beam densities



Recirculating beam neutralizer concept
(several variants exist, to be compared and optimized)

Figure 2: Comoving beam is maintained in the common straight section of two storage rings.

Beam energy: 1 MeV
 Beam Size: 0.2x0.05 m
 Divergence= 5mrad
 Inject. angle: 5 deg.
 Dipole angles= -2 deg.
 Neutral Yield: 75 %
 (\approx no losses in 3 turns)

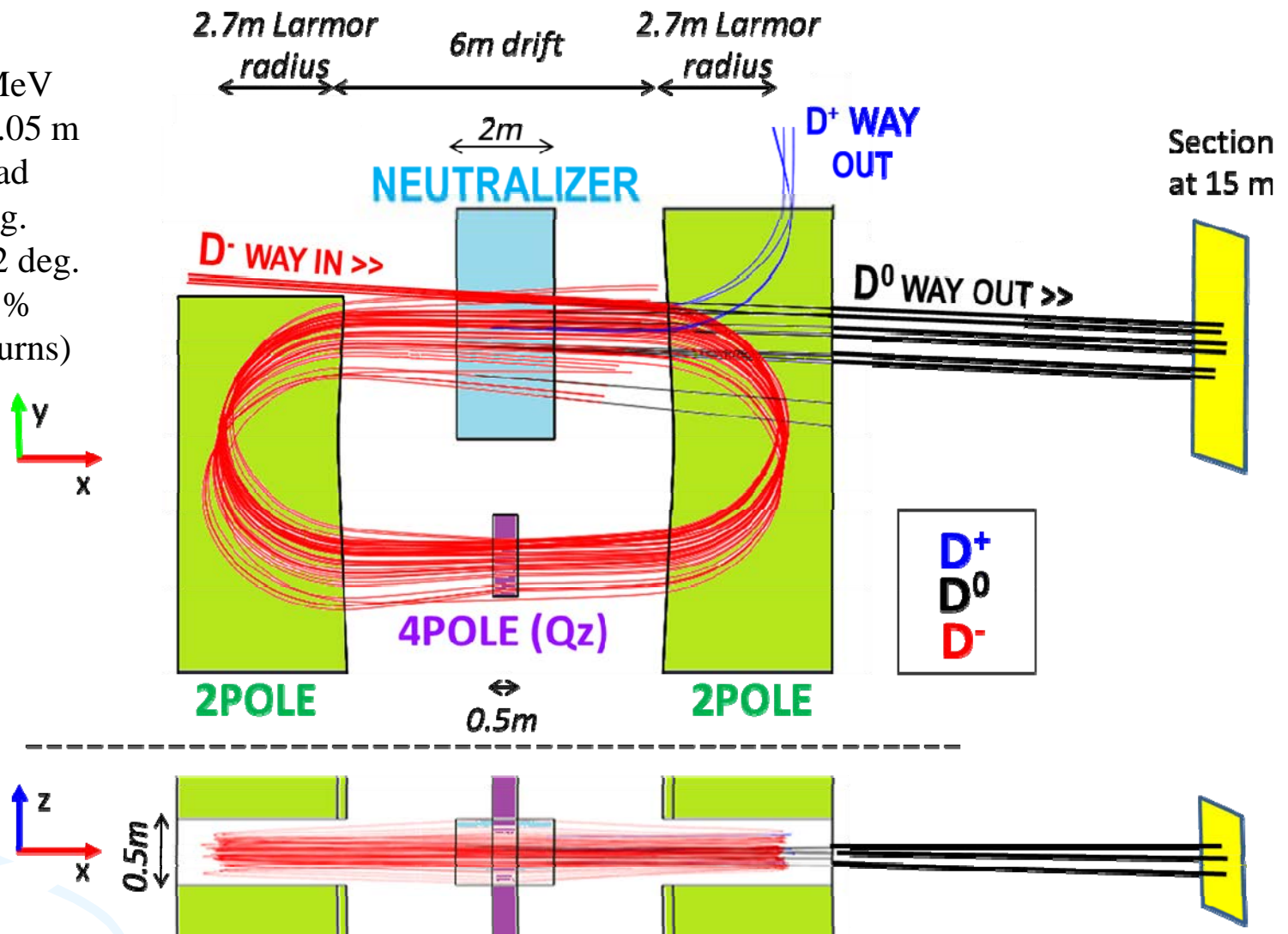


Figure 6: many particle calculation for baseline concept, with neutralizing collision modelled with Monte Carlo approach; note that angular spread of D^0 output is still acceptable, notwithstanding the large angle used for special injection arrangement.