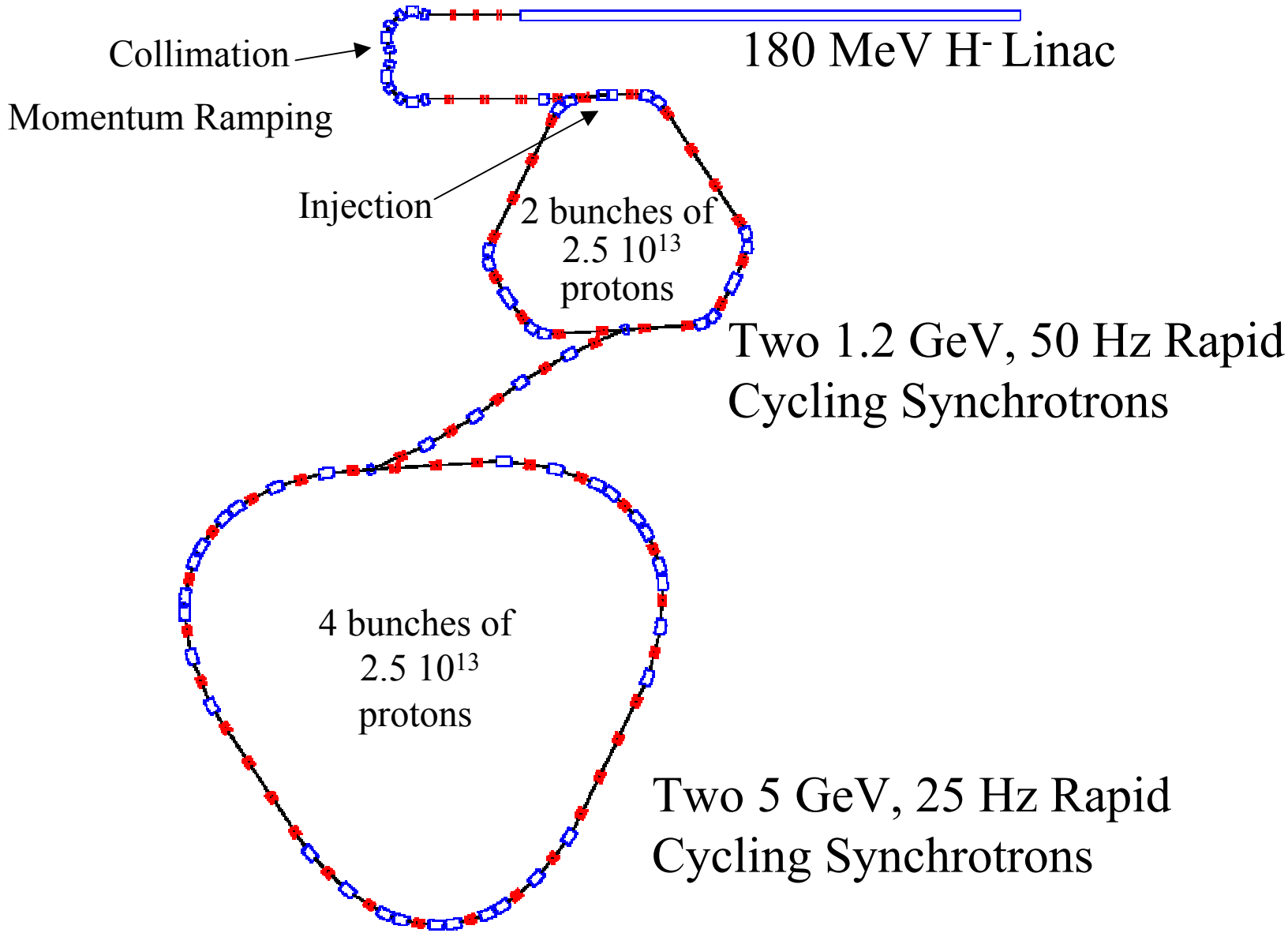
UK Neutrino Factory Studies

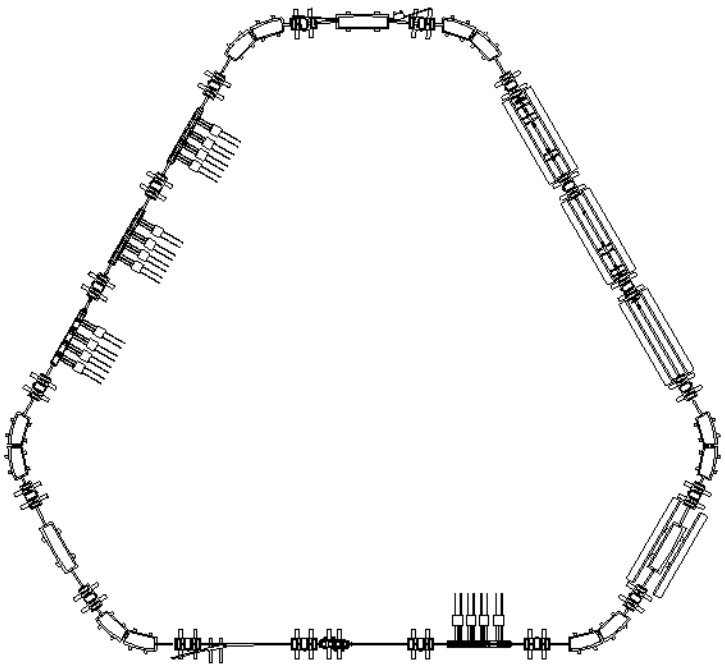
- Synchrotron-based proton drivers
  - 5 GeV, 4MW, 50 Hz model
  - 15 GeV, 4 MW, 25 Hz model
  - 25 GeV, 4 MW, slow cycling (with CERN)

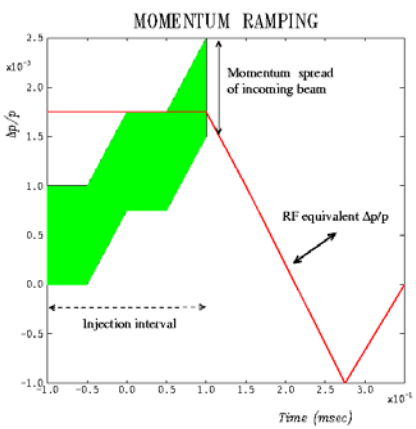
- CERN SPL+accumulator and compressor rings

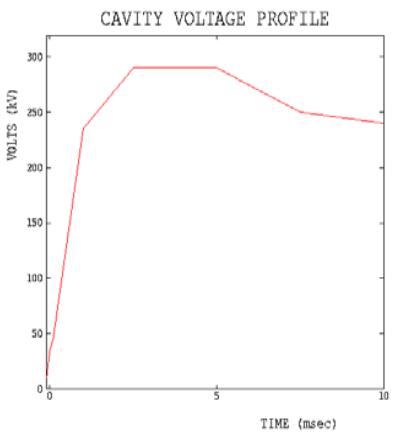
5GeV, 50 Hz Proton Driver

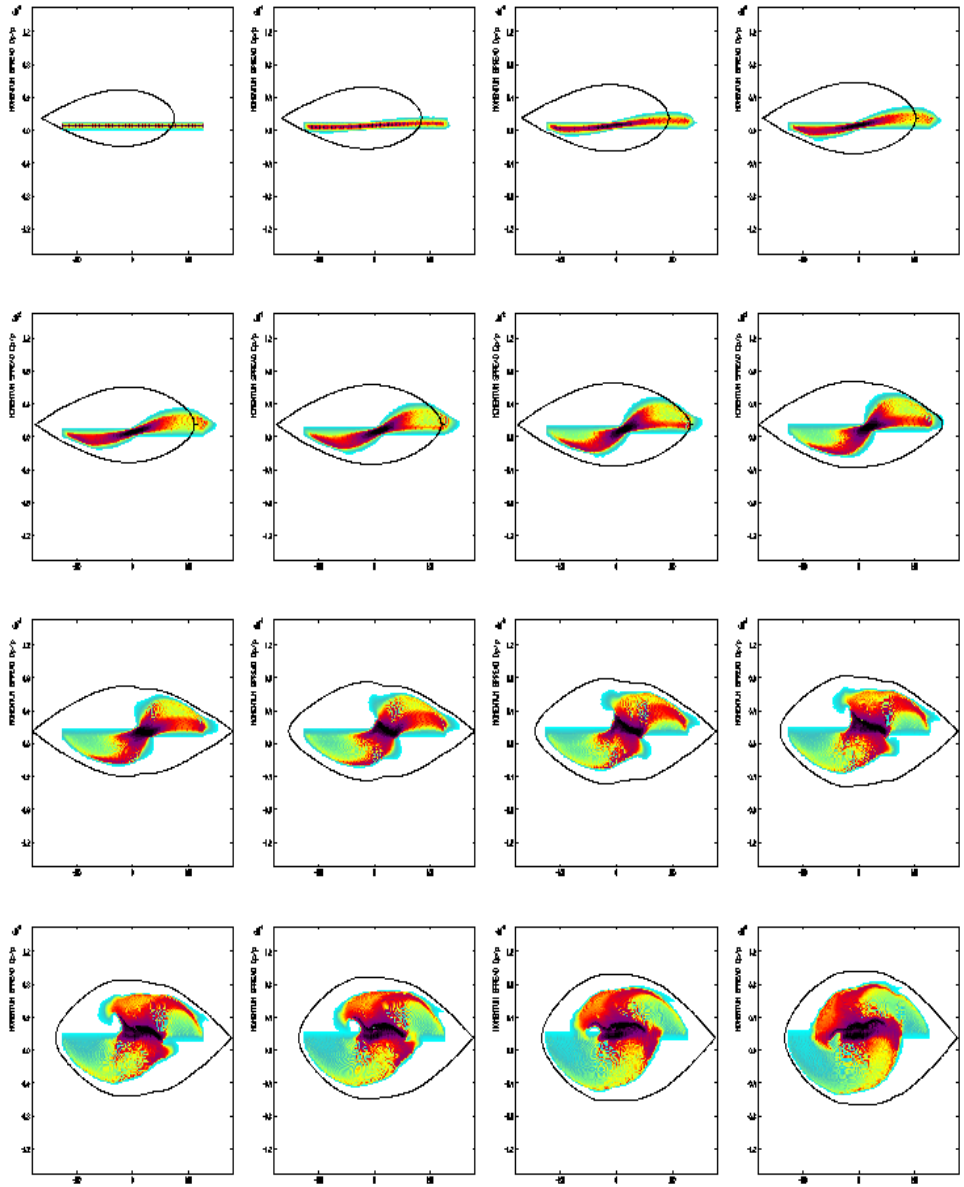


RCS1 LONGITUDINAL INJECTION at 180 MEV

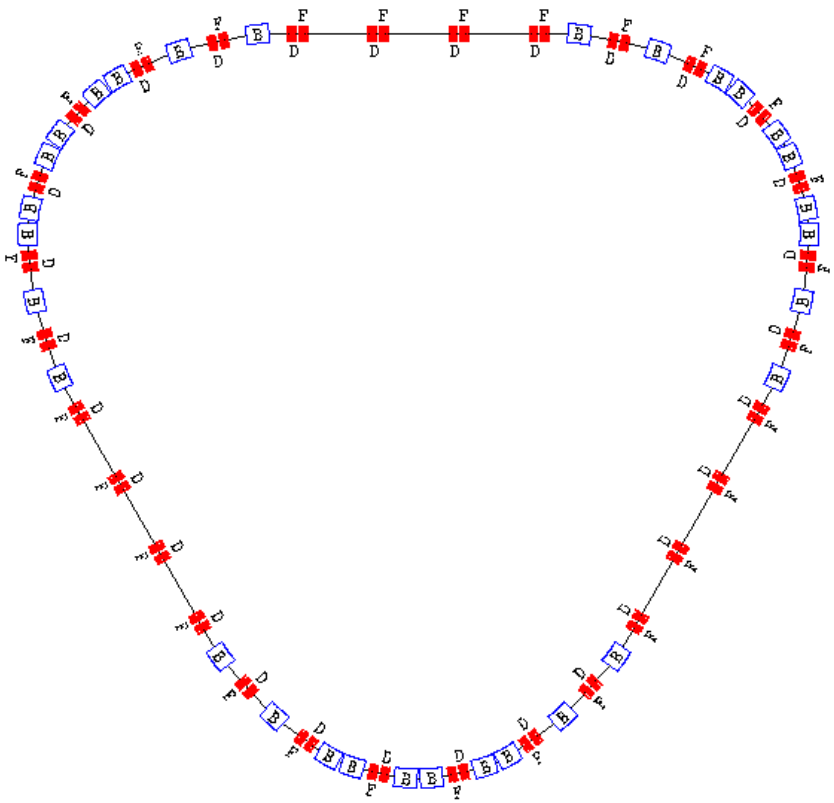


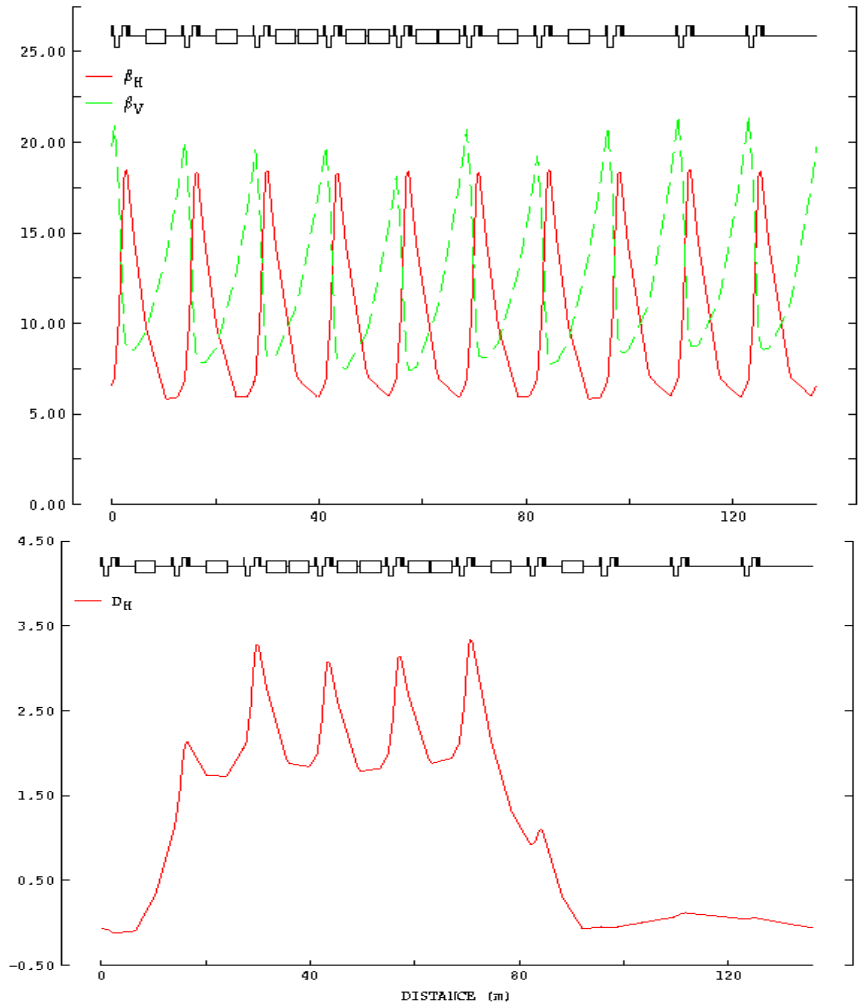




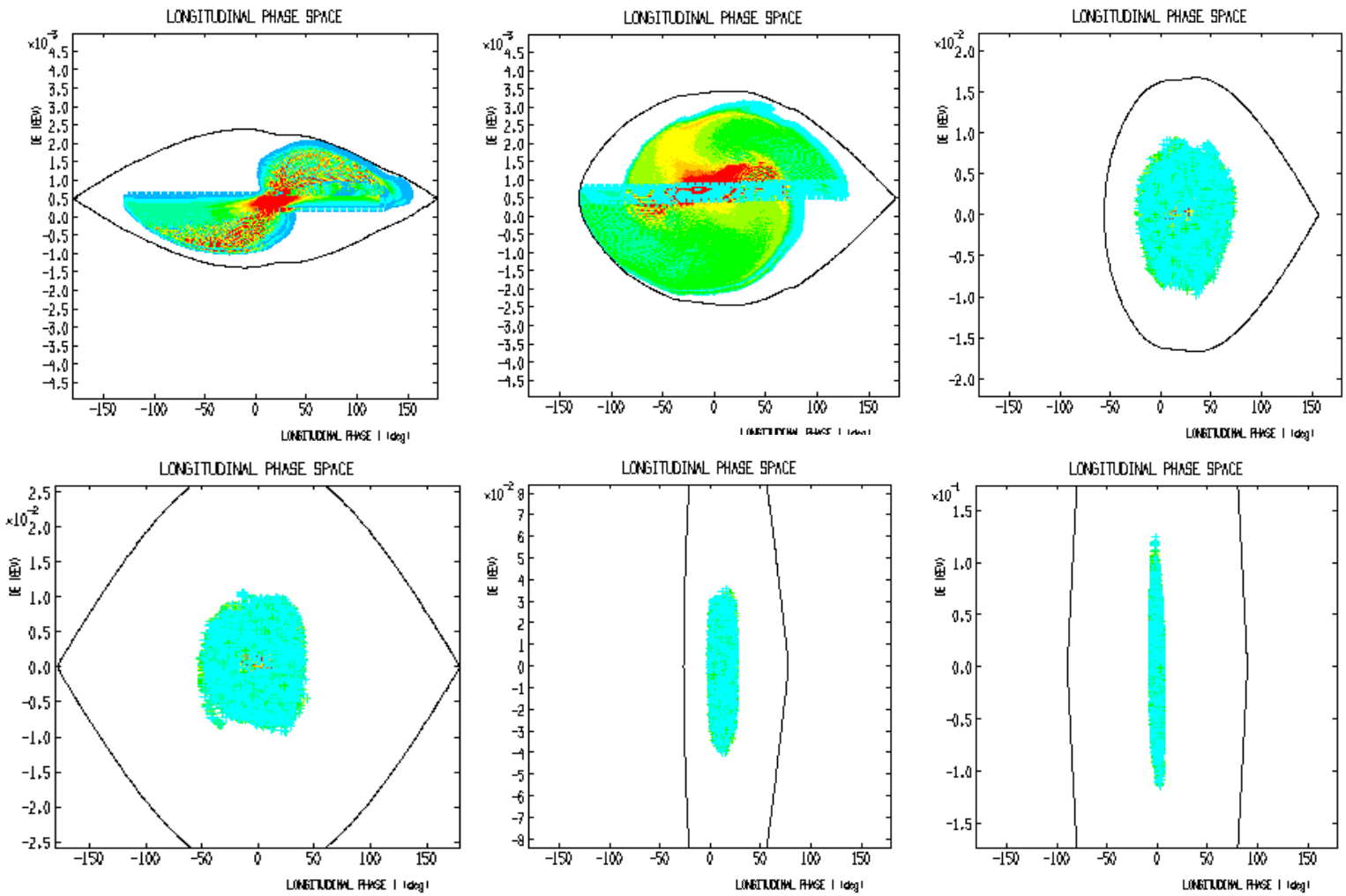


RCS2: 1.2 to 5 GeV

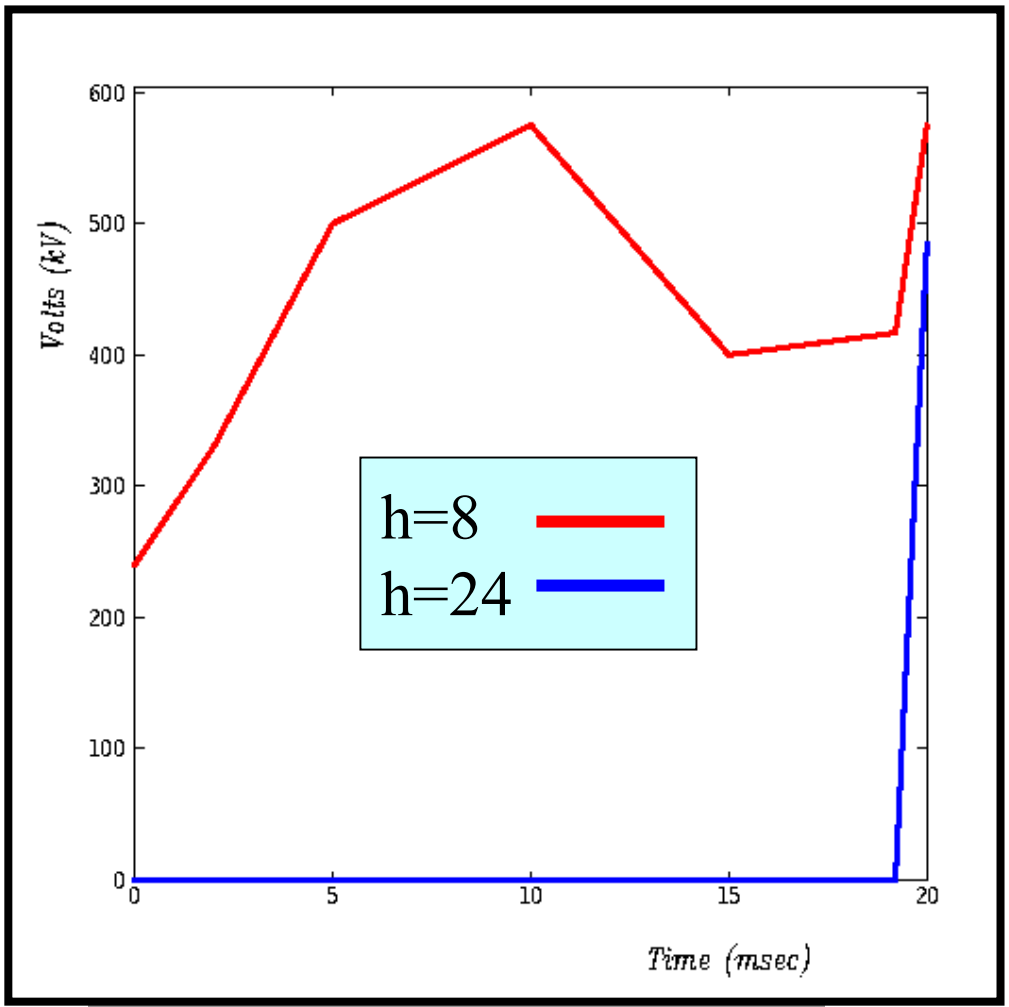




Driver 1: Injection, Acceleration and Compression

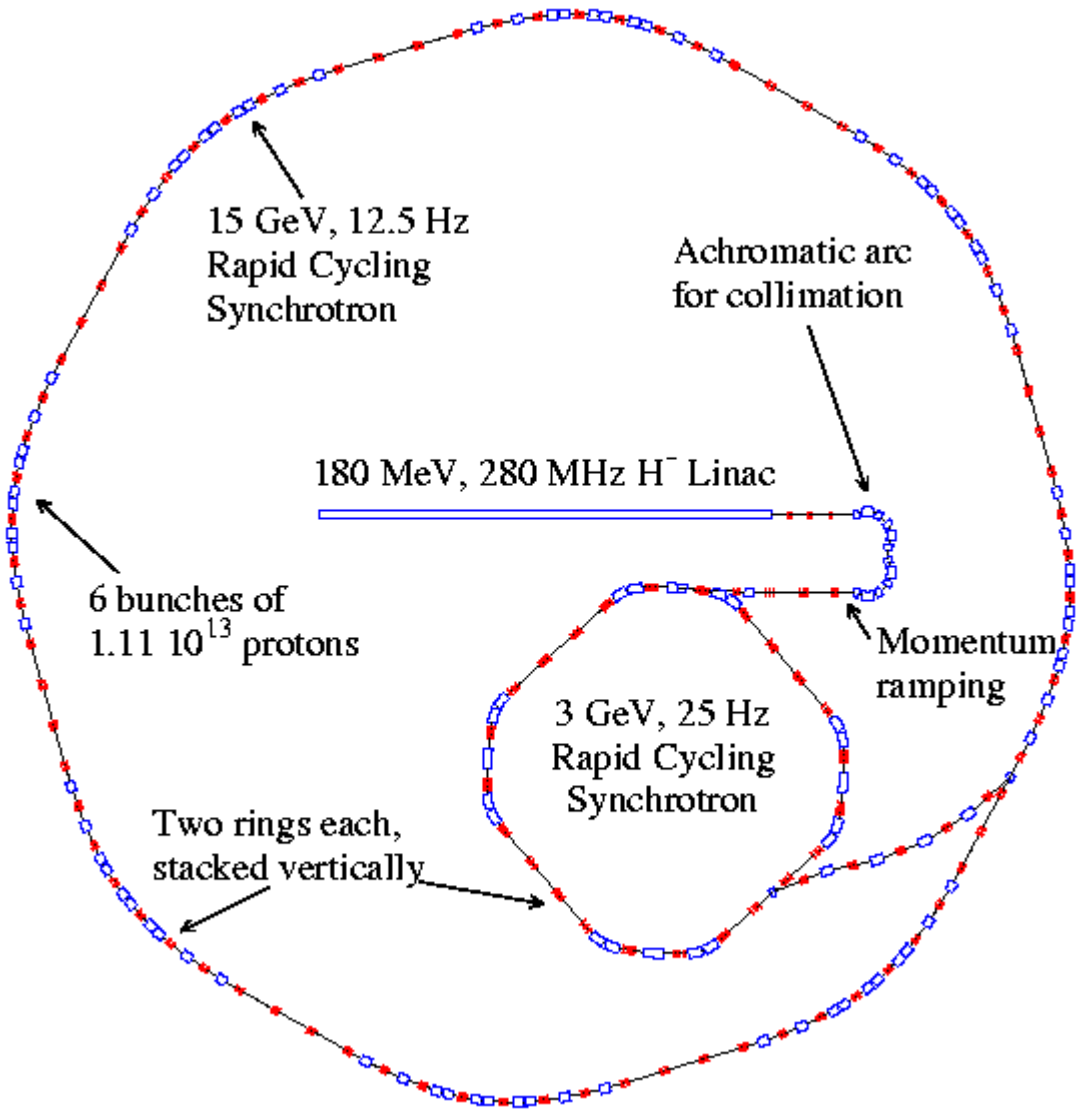


RCS2 (5GeV) Cavity Voltages During Acceleration & Compression to 1ns rms



Time (ms)	Volts (kV)	
	h=8	h=24
0.0	240	0
2.0	330	0
5.0	500	0
10.0	575	0
15.0	400	0
19.2	416.8	0
20.0	575	498.5

15GeV, 25 Hz Proton Driver

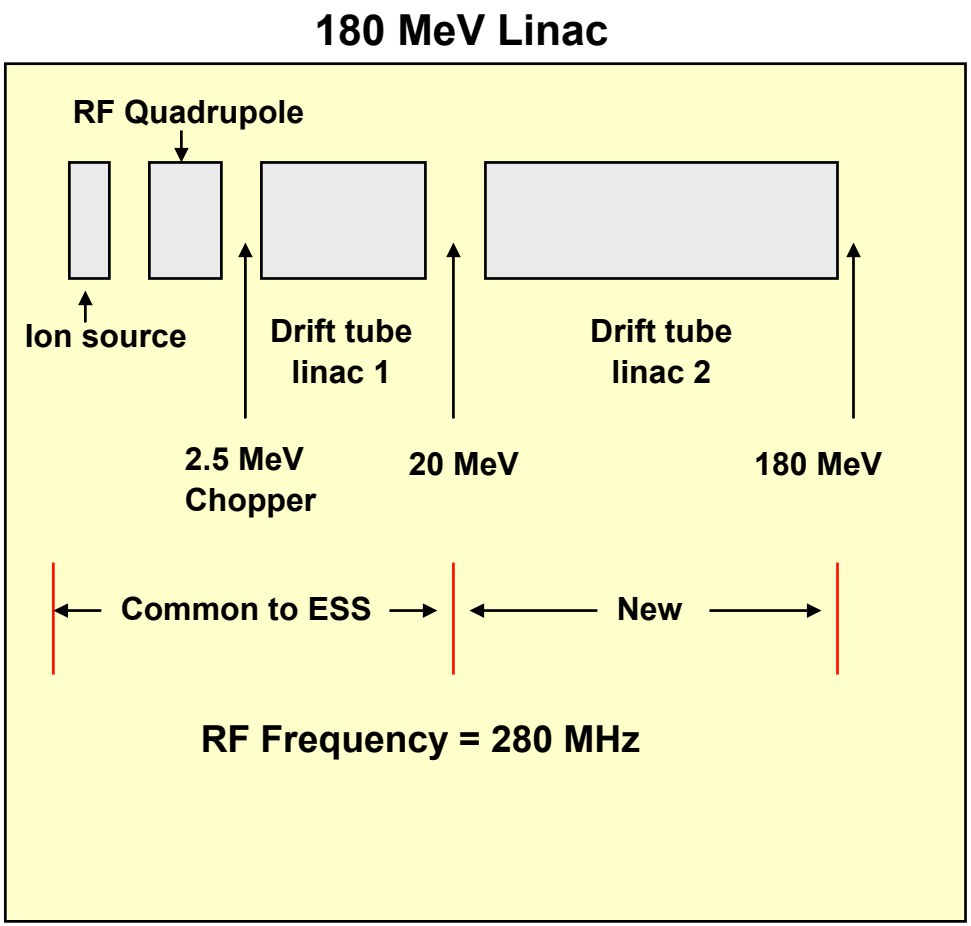


Proton Driver Figure of Merit

- For a given power (4MW), target peak proton power density ~ 1/(Kinetic energy *T* x frequency *f*). *Tf* is a useful figure of merit.

MACHINE	T (GeV)	f (Hz)	FIGURE OF MERIT
CERN SPL+rings	2.2	75	165
RAL RCS Driver I	5.0	50	250
RAL RCS Driver II	15.0	25	375
CERN RCS	30.0	8	240

νFact Accelerator R&D



- Concentrate on linac front end.
- Design similar to ESS from ion source to 20 MeV
- R&D for H^- ion sources generating currents of ~60 mA
- RFQ development needed for ISIS, ESS and νFact
- Development with industry of IOT power supplies for 280 MHz RF cavities (ESS/νFact)
- Construction and testing of beam chopper (ESS/νFact). Collaboration with TSL, Sweden.