Status of Forward Region

- Update on Todo items
- News about IP8, coordinate systems
- Reports from individual detectors

Michael Murray, 1st July 2021

Recent Todo Items

>>> Todo: (Shima, Quan) Check ZDC linearity and resolution as a function of energy all the way to 275GeV.

Need to get neutron reconstruction going first.

>>> Todo:(Igor, Or) Talk to groups about off momentum detectors.

Started conversations with Israeli groups.

>>> Todo: (Bill, Shima, Yuji) Check ZDC interference with magnet BXDS01B and possibly beam pipe.

>>> Todo: (Axel) Invite Alex Jentsch and Yulia Furletova to give a presentation on this to the exclusive group.

Thursday morning, July 8, 8:30 AM.

>>> Todo: (Michael, Yuji) Start spreadsheet on channel count, cost for all forward detectors.

Michael working on this, thanks Axel for sending something for Roman Pots.

Cost Estimate for Roman Pots

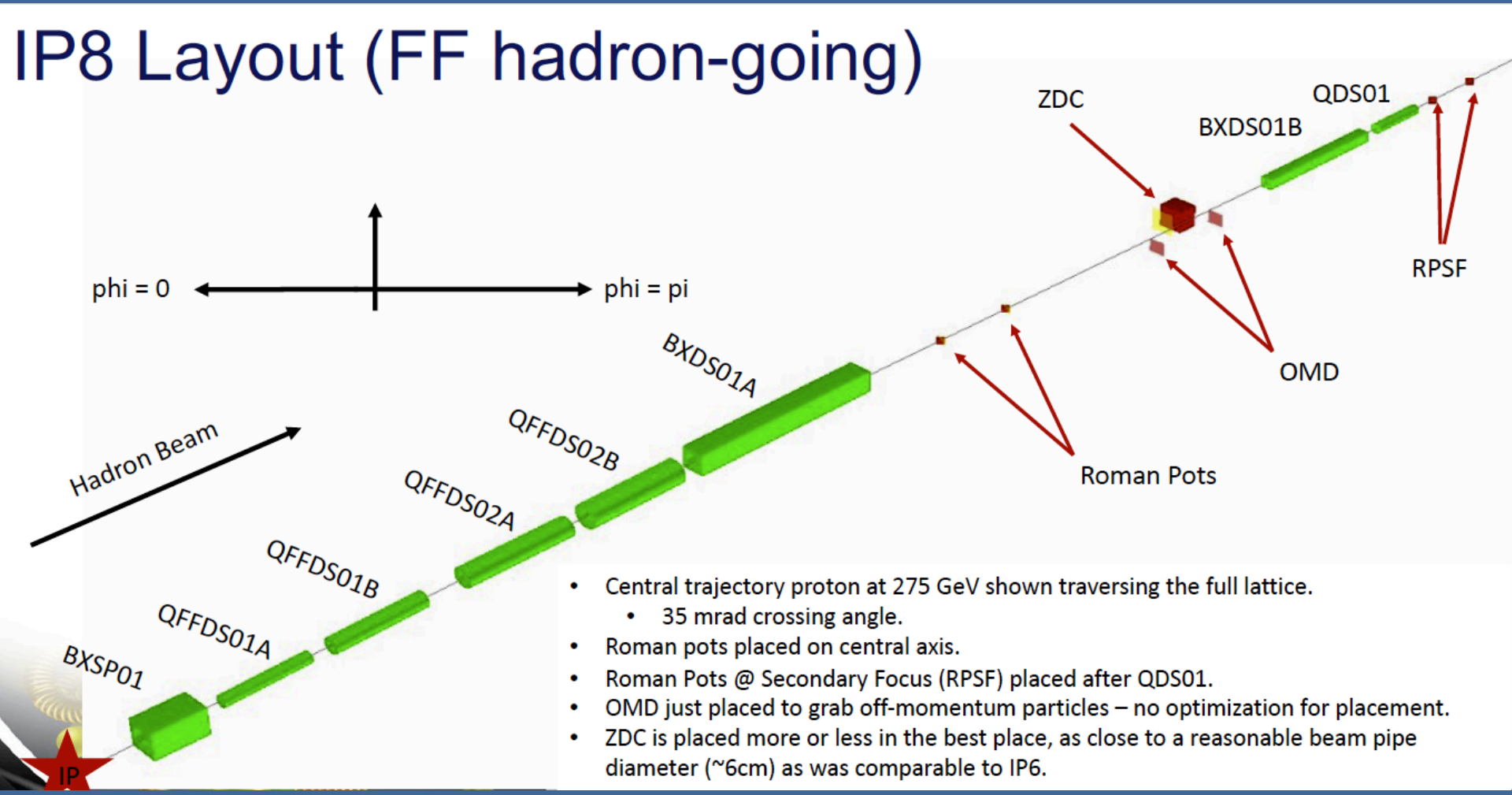
CORE Cost Estimate for EIC Roman Pots Detector (direct costs)

(exclude labor for assembly, test-beanches costs, R&D and preproduciton costs, integration and commissioning, and off-det. DAQ boards)

Item	Reference (HGTD) [kCHF]	HGTD scale no.	EIC scale no.	Scale Factor	EIC [k$]	Comments
Sensors	**2403**	6.4	0.131072	**0.0205**	**200.00**	From G. Giacomini: assume costs of masks, implantation, bare silicon, and labor (techician)
ASICs	**1094**			0.2559	**280.00**	calculation by Laurent, assuming NRE and costs per wafer, for 900 ASICs (15 wafers) that included a <70
Peripheral Electronic Boards	**638**	16064	512	**0.0319**	**20.33**	scale by no. ASICs (HGTD = 16064)
LV system	**422**	3.6	0.524288	**0.1456**	**61.46**	scale by no. channels (HGTD = 3.6M)
HV system	**955**	8032	128	**0.0159**	**15.22**	scale by no. sensors (HGTD = 8032)
Cables, Electrical connectors	**691**	3.6	0.524288	**0.1456**	**100.63**	scale by no. channels (HGTD = 3.6M)
Fibers, Optical connectors	**209**	3.6	0.524288	**0.1456**	**30.44**	scale by no. channels (HGTD = 3.6M)
Module Assembly (incl. hybridisation, flexes)	**1392**	8032	512	**0.0637**	**88.73**	scale by no. ASICs (HGTD = 16064)
Cooling system	**1167**	34.2	1.63	**0.0477**	**55.62**	scale by Watts (HGTD = 34.2 kW for total power, incl. sensors, ASICS, flexes, vessel, air pickup, pre-heat
On det cooling/suport plate cooling	**190**	6.4	0.131072	**0.0205**	**3.89**	scale by silicon area (HGTD = 6.4 m2)
TOTAL	**9161**				**856.33**	

From Carlos Munoz Camacho

New IP8 layout announced



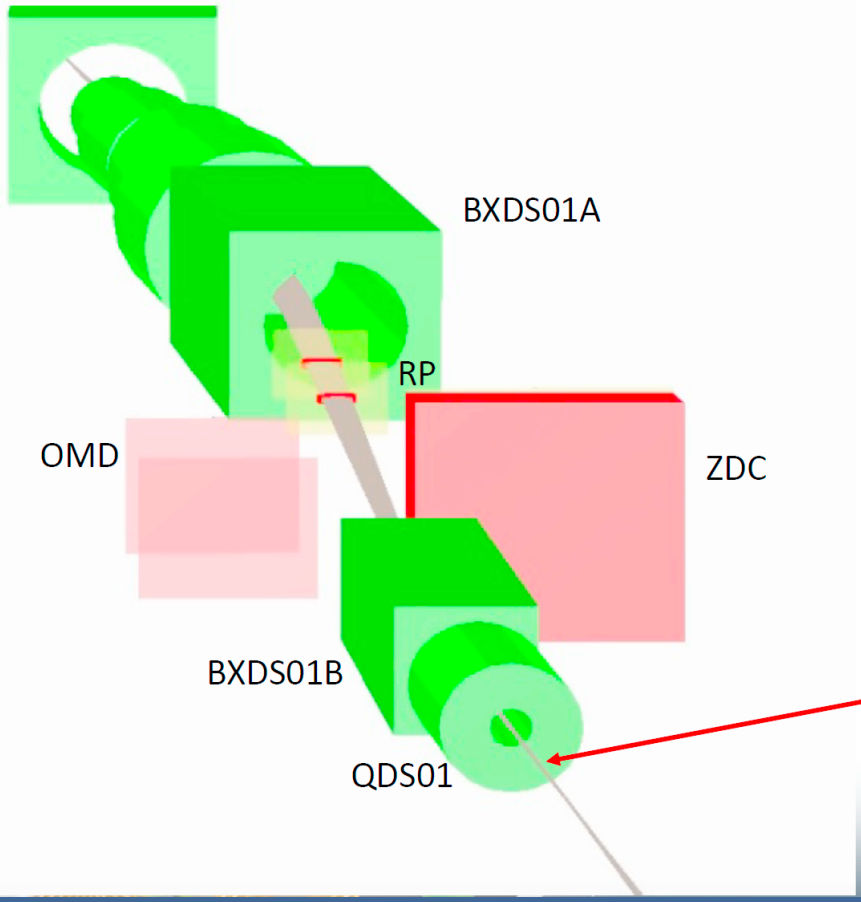
- Central trajectory proton at 275 GeV shown traversing the full lattice.
  - 35 mrad crossing angle.
- Roman pots placed on central axis.
- Roman Pots @ Secondary Focus (RPSF) placed after QDS01.
- OMD just placed to grab off-momentum particles – no optimization for placement.
- ZDC is placed more or less in the best place, as close to a reasonable beam pipe diameter (~6cm) as was comparable to IP6.

Alex Jentsch

IP8 secondary focus

Secondary Focus

- p = 275 GeV protons
- 0 < theta < 2 mrad



- Secondary focus behaves nicely and allows for an additional spot for detectors (or a complete reconfiguration).

Global Coordinate System Change

Proton beam is towards -x for IP6 (from inner ring cross to the outer ring). Currently, in all simulation tools, the proton beam is towards

+x for IP6 which is incorrect.

The global coordinate system: +z is opposite to the electron beam direction, +y points to the sky, and +x points to the center of the accelerator ring. This coordinate system is consistent among all simulation tool kits, and will remain the same.

In terms of the Fun4all modifications: all central detectors (barrel) will remain; all forward and backward components including both end-caps must rotate 180 degrees long z-axis.

Backup