CURRENT STATUS AND FUTURE PROJECTS OF THE ITHEMBA LABS CYCLOTRON FACILITIES

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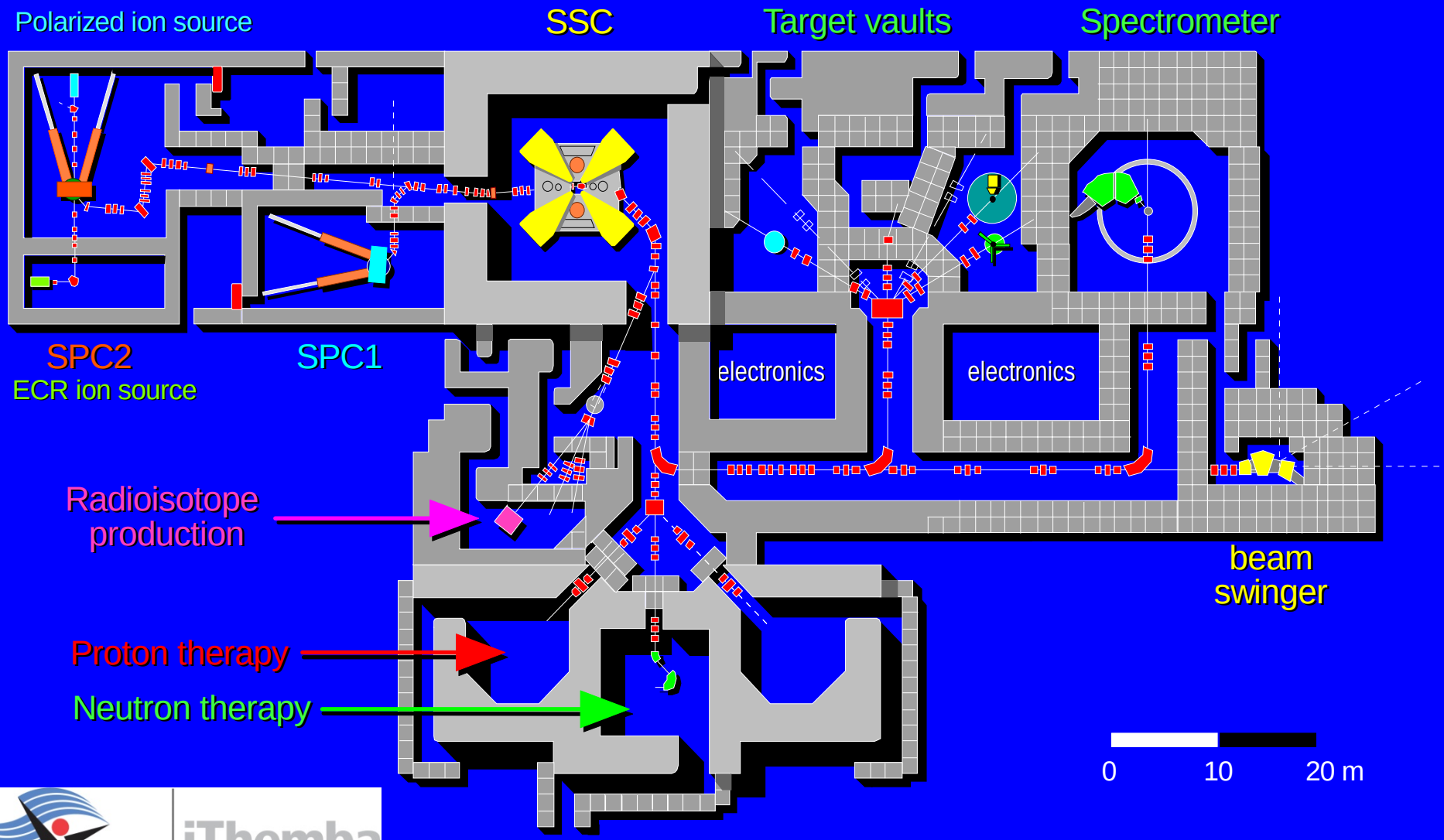
Cyclotrons'2010, IMPCAS, Lanzhou, China, 6 -9-2010

Separated-Sector Cyclotron Facility



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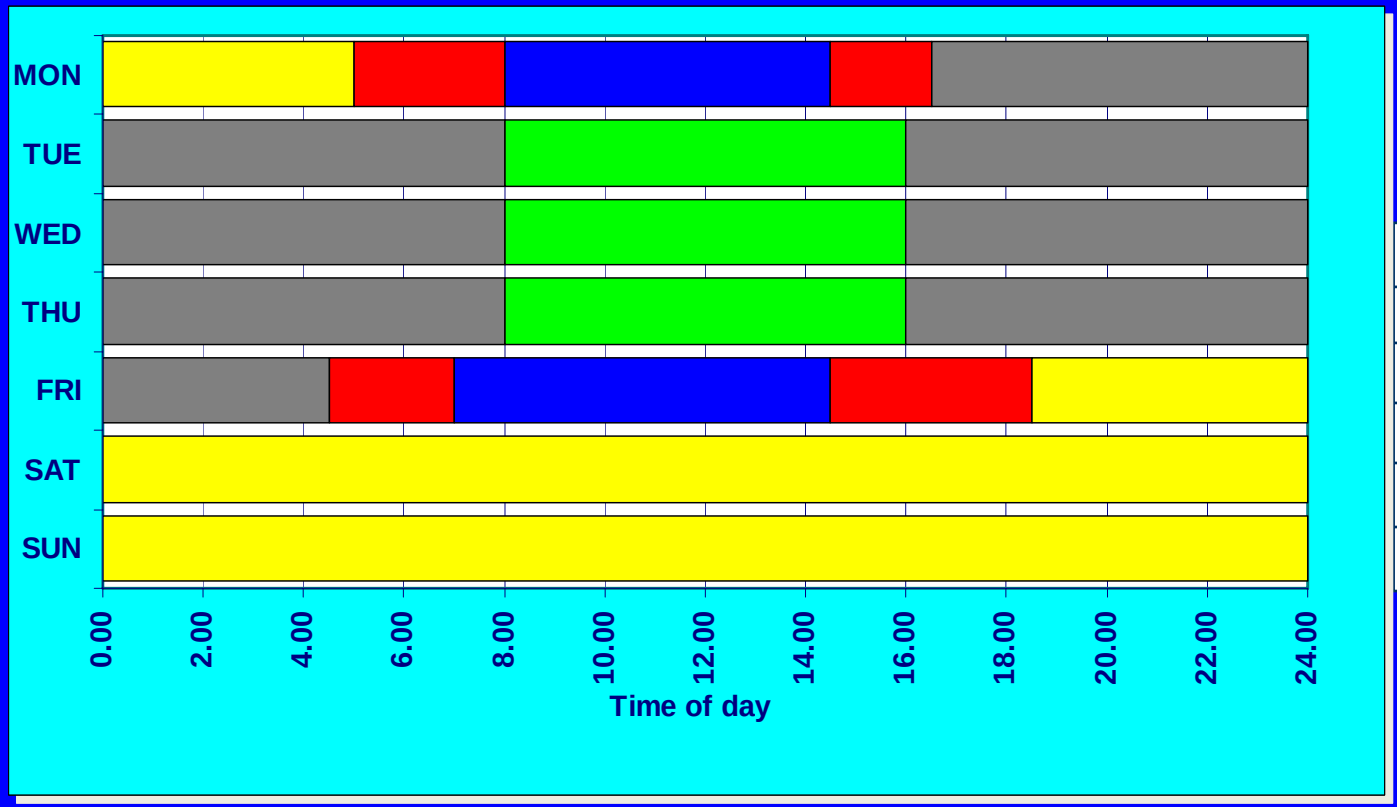
BEAM SCHEDULE



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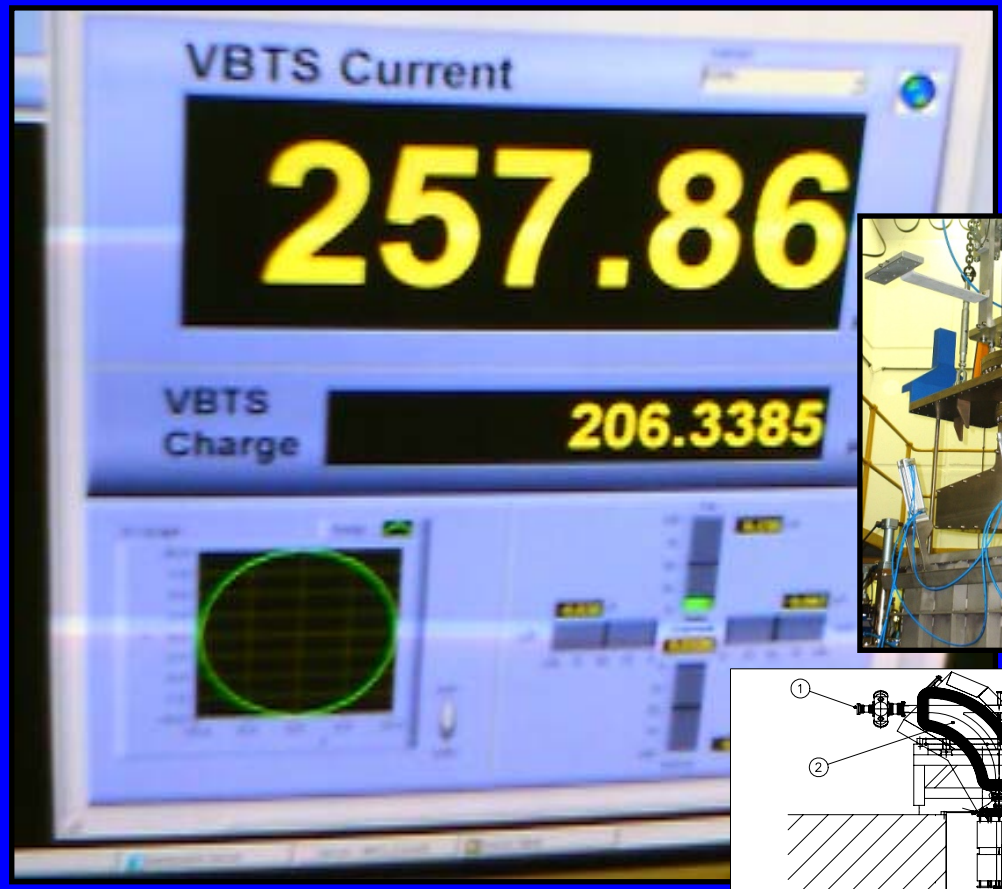
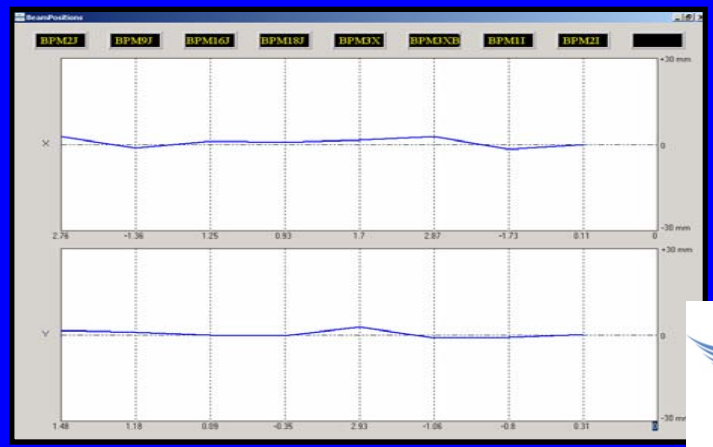
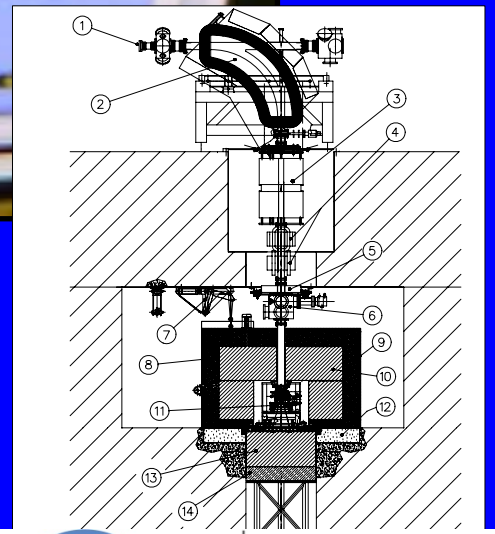
Operating statistics for the past 8 years

Year	Beam Supplied as:		% of Scheduled beam time for:	
	% of Total time	% of Scheduled* time	Energy Changes	Interruptions
2002	72.29	82.69	7.50	7.28
2003	70.93	82.79	6.87	8.08
2004	72.0	84.9	6.7	5.9
2005	71.3	83.6	5.5	6.4
2006	66.1	80.3	5.5	7.9
2007	67.1	79.28	5.4	10.4
2008	62.0	75.17	4.0	14.3
2009	70.5	83.7	6.9	7.9







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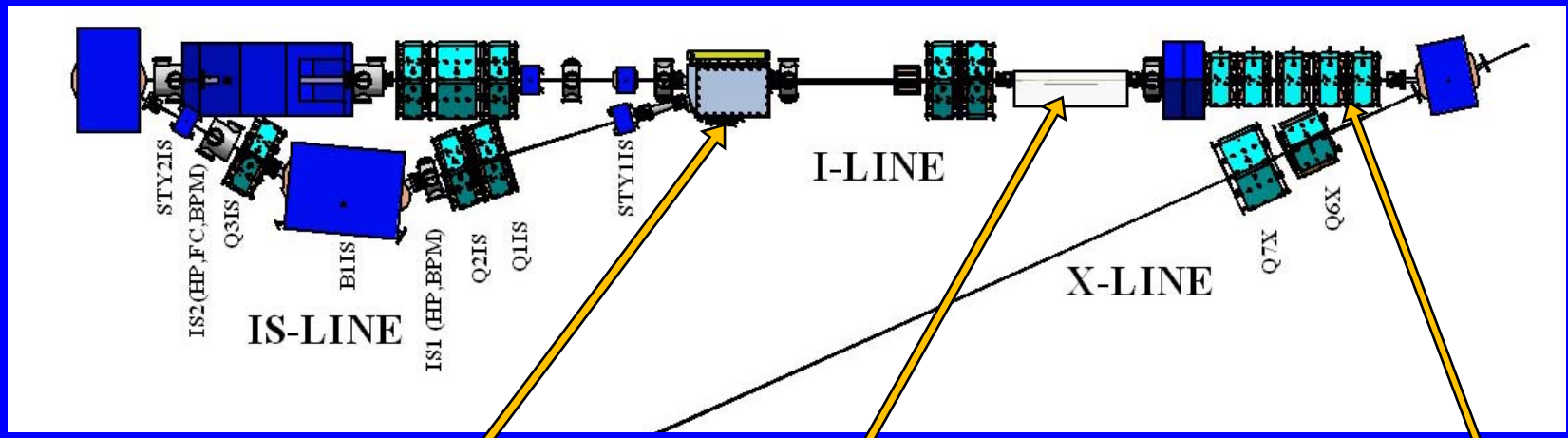
Layout of the beam splitter



Electrostatic channel – a mirror image of PSI design

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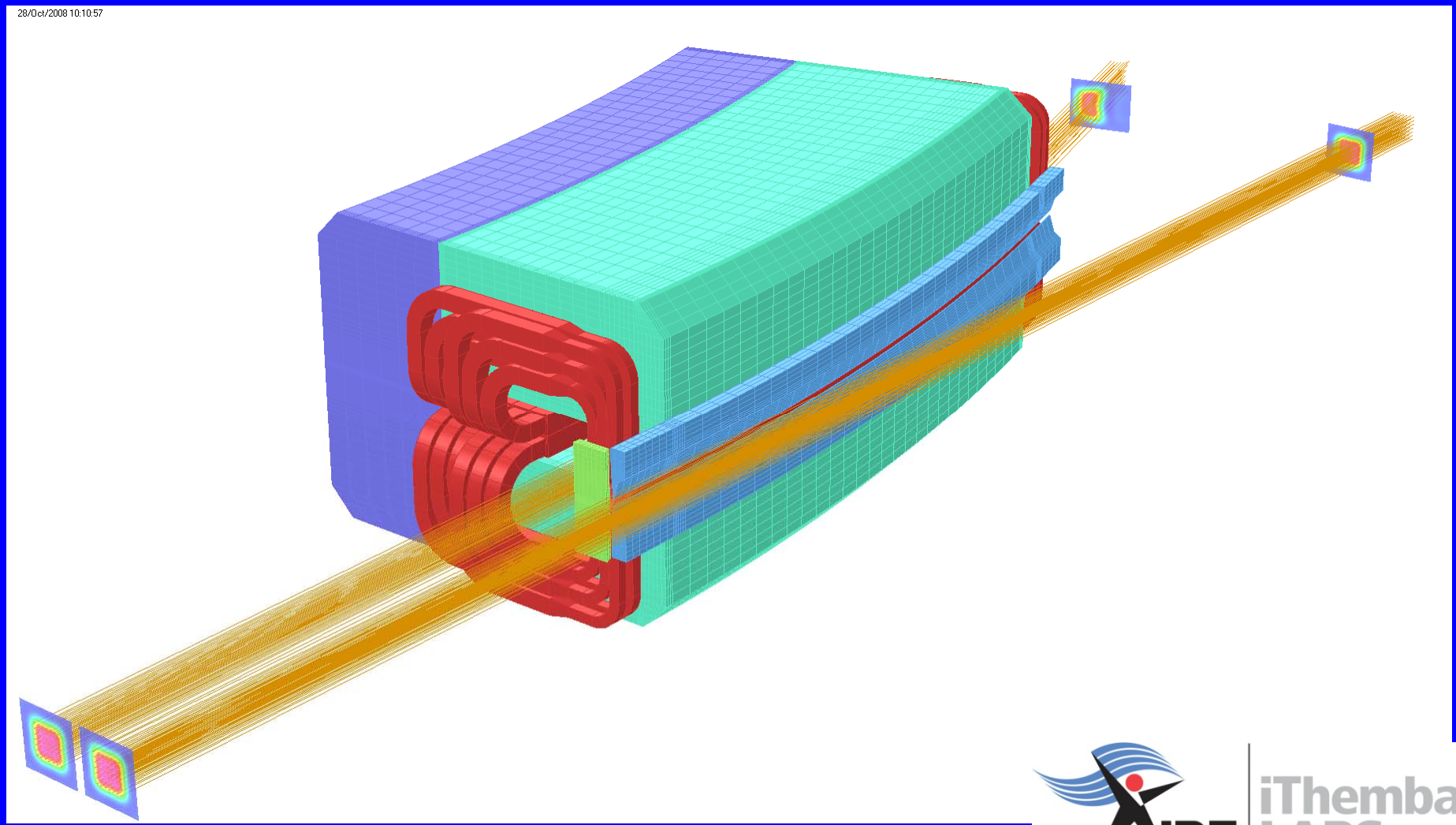
Magnetic channel



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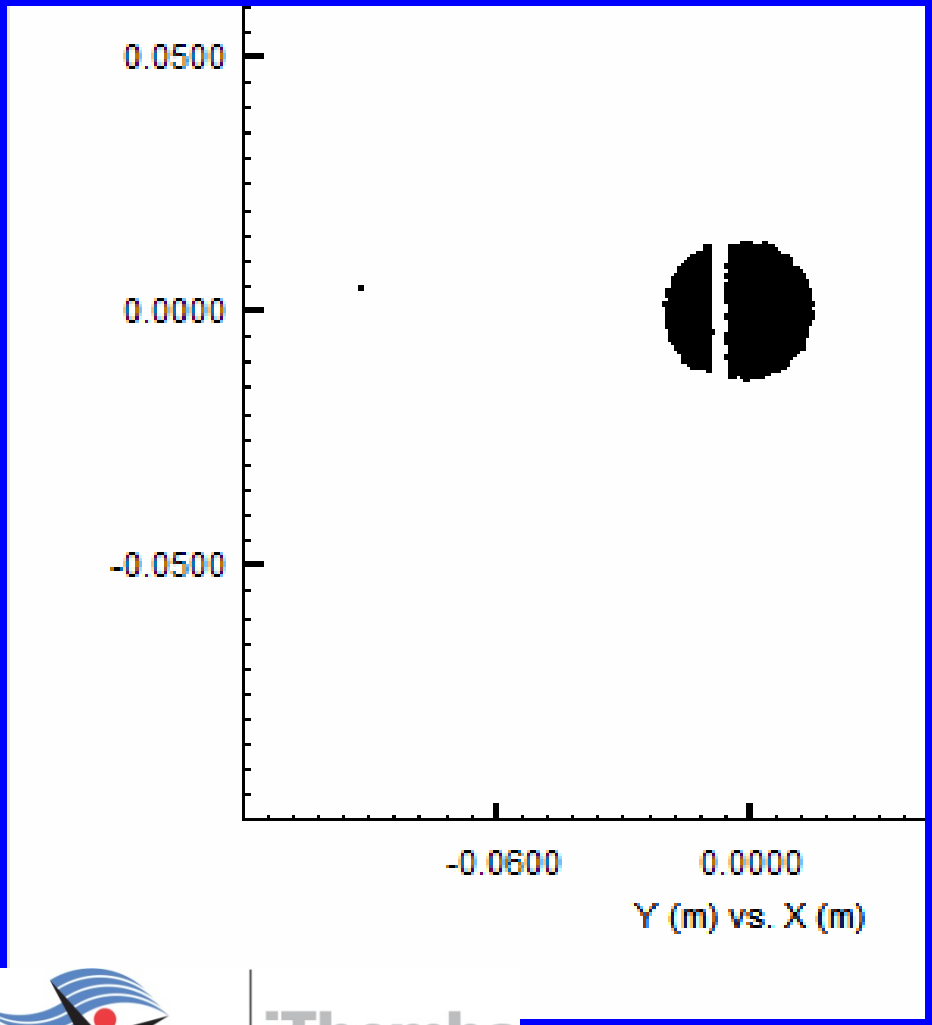
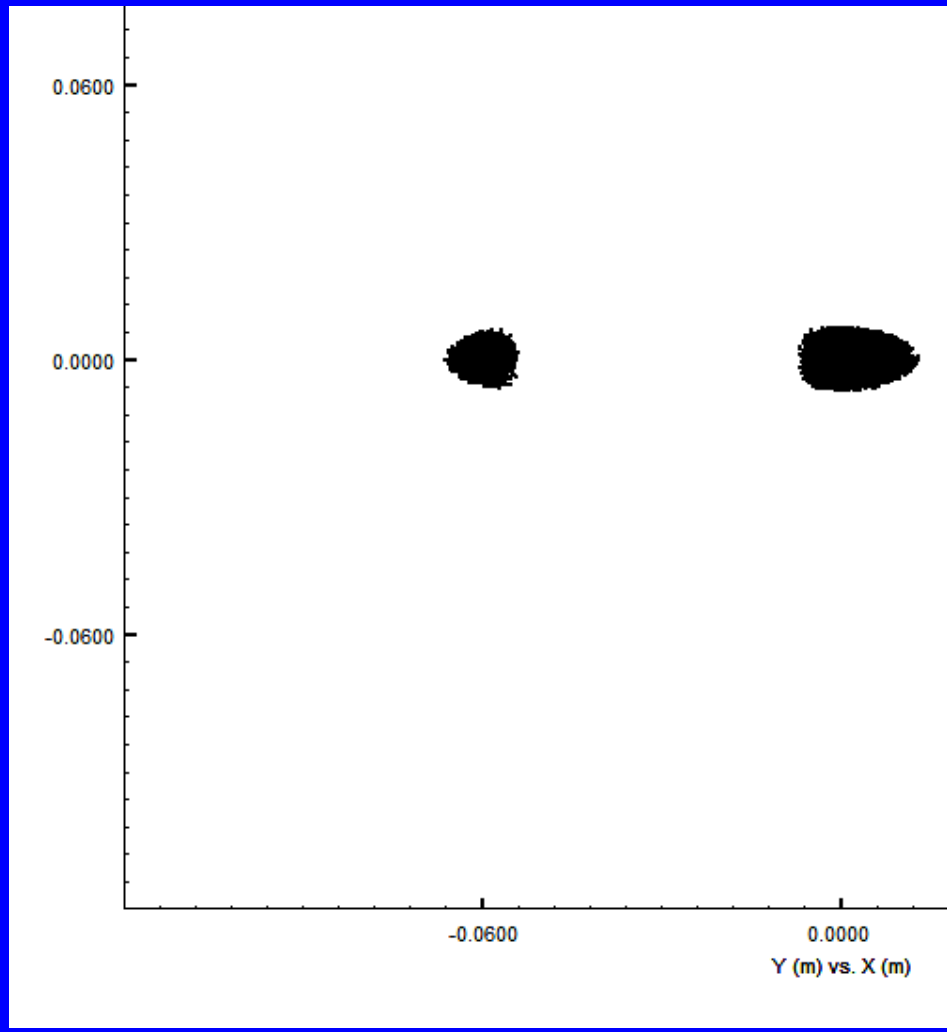
Beam direct behind the electrostatic channel



Beam in front of the magnetic channel



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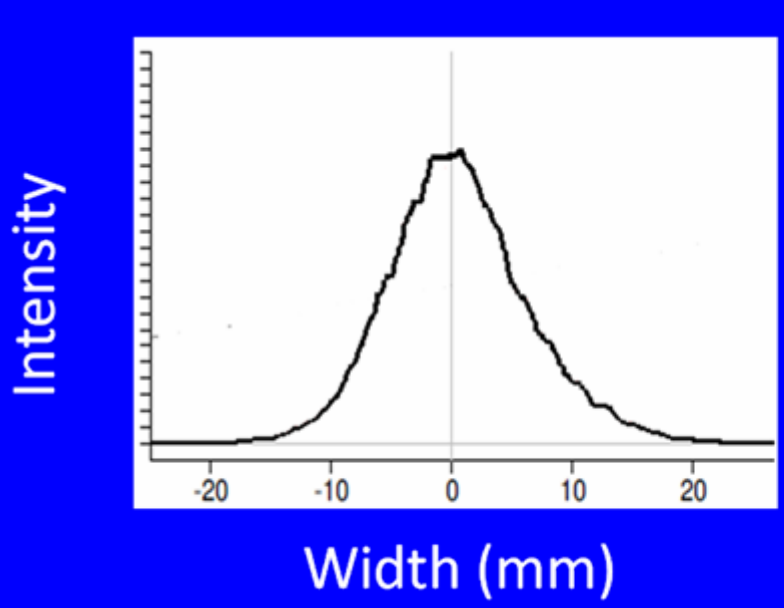
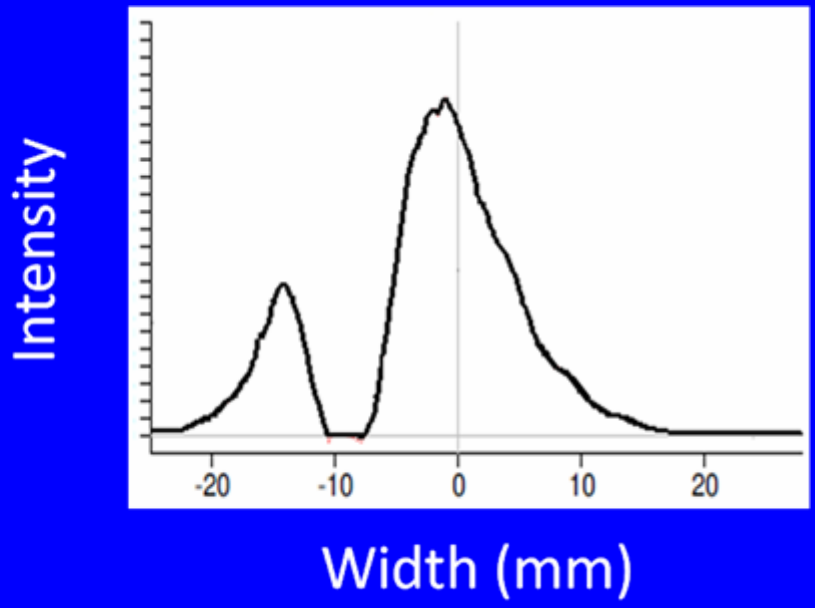
The beam profile in the horizontal plane in front of the electrostatic channel (left) and 100 mm after the electrostatic channel (right), showing clear separation between the deflected part and the main beam.





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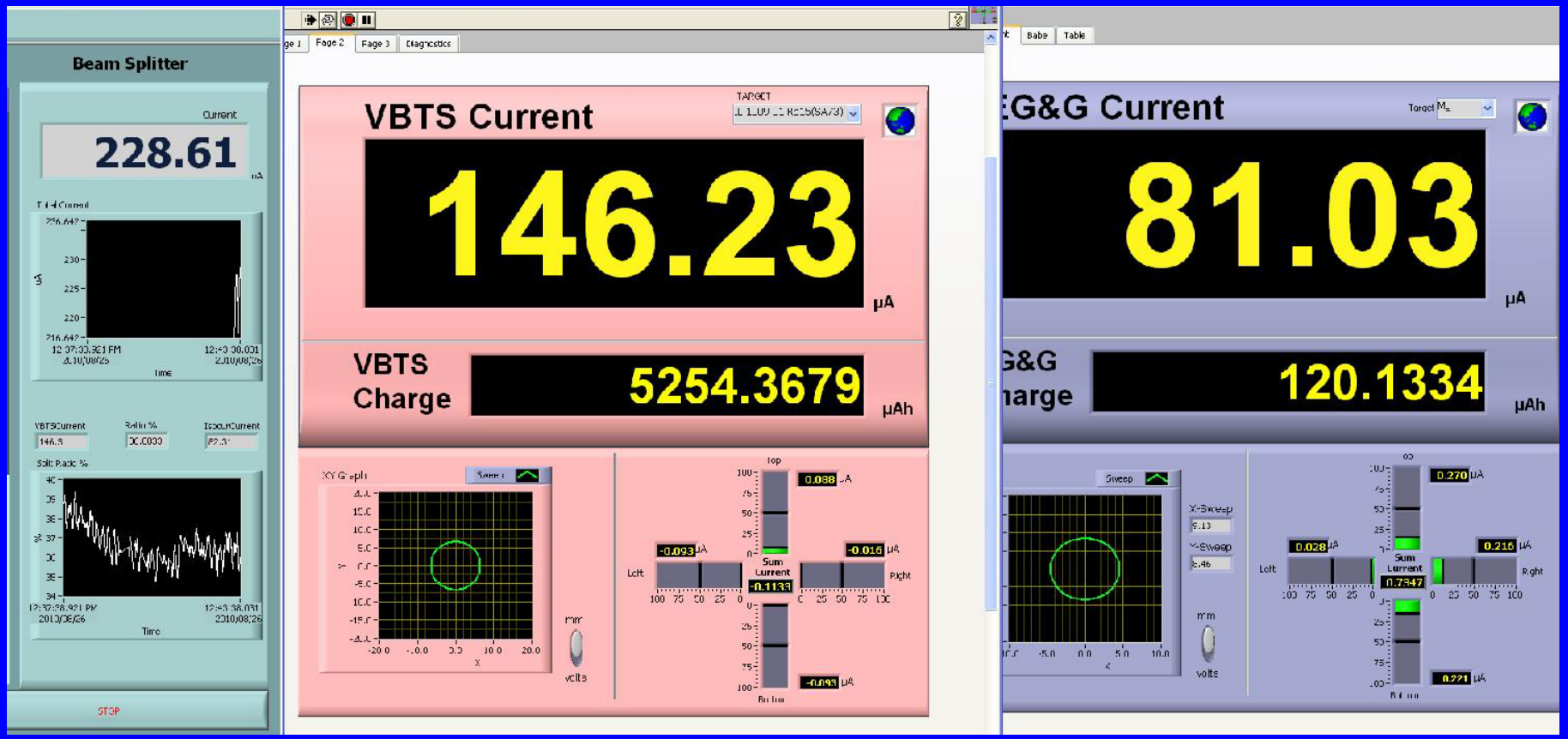
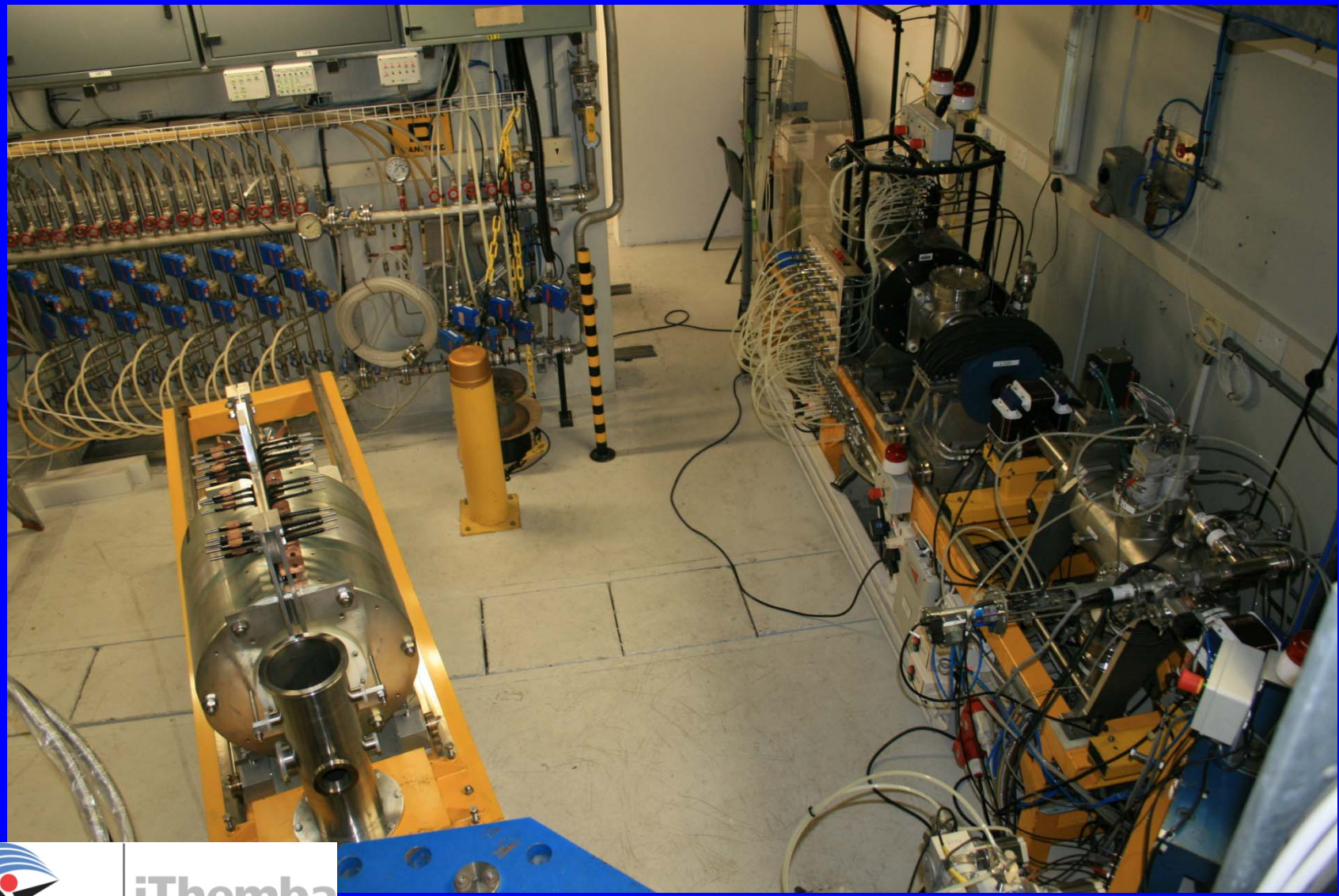
Measured beam current on the two target stations



The phase probe structure, supporting the fixed probes, being installed in the vacuum chamber of the Separated Sector Cyclotron

HMI ECRIS and the GTS2 ECRIS



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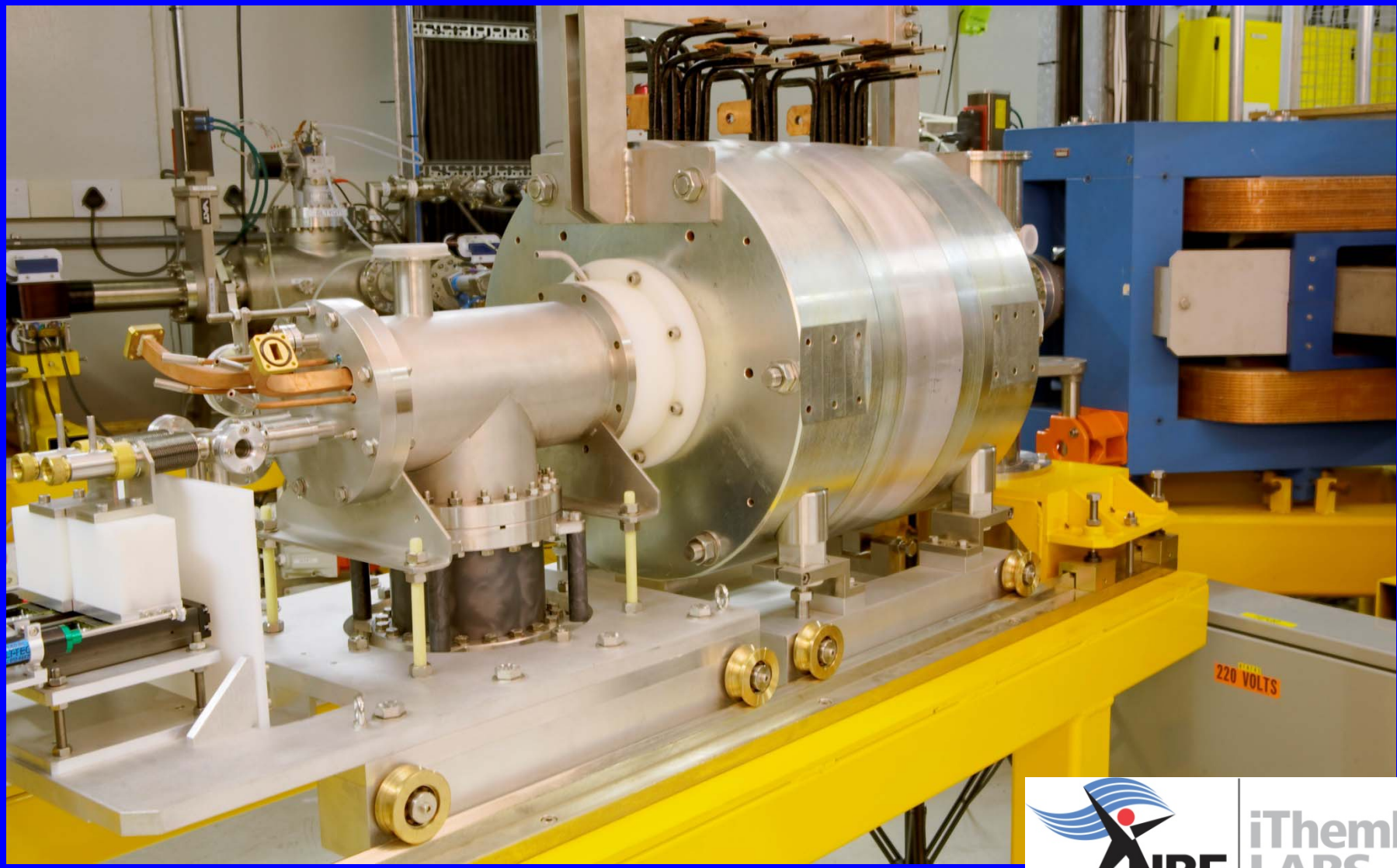
Partially assembled GTS2 ECRIS



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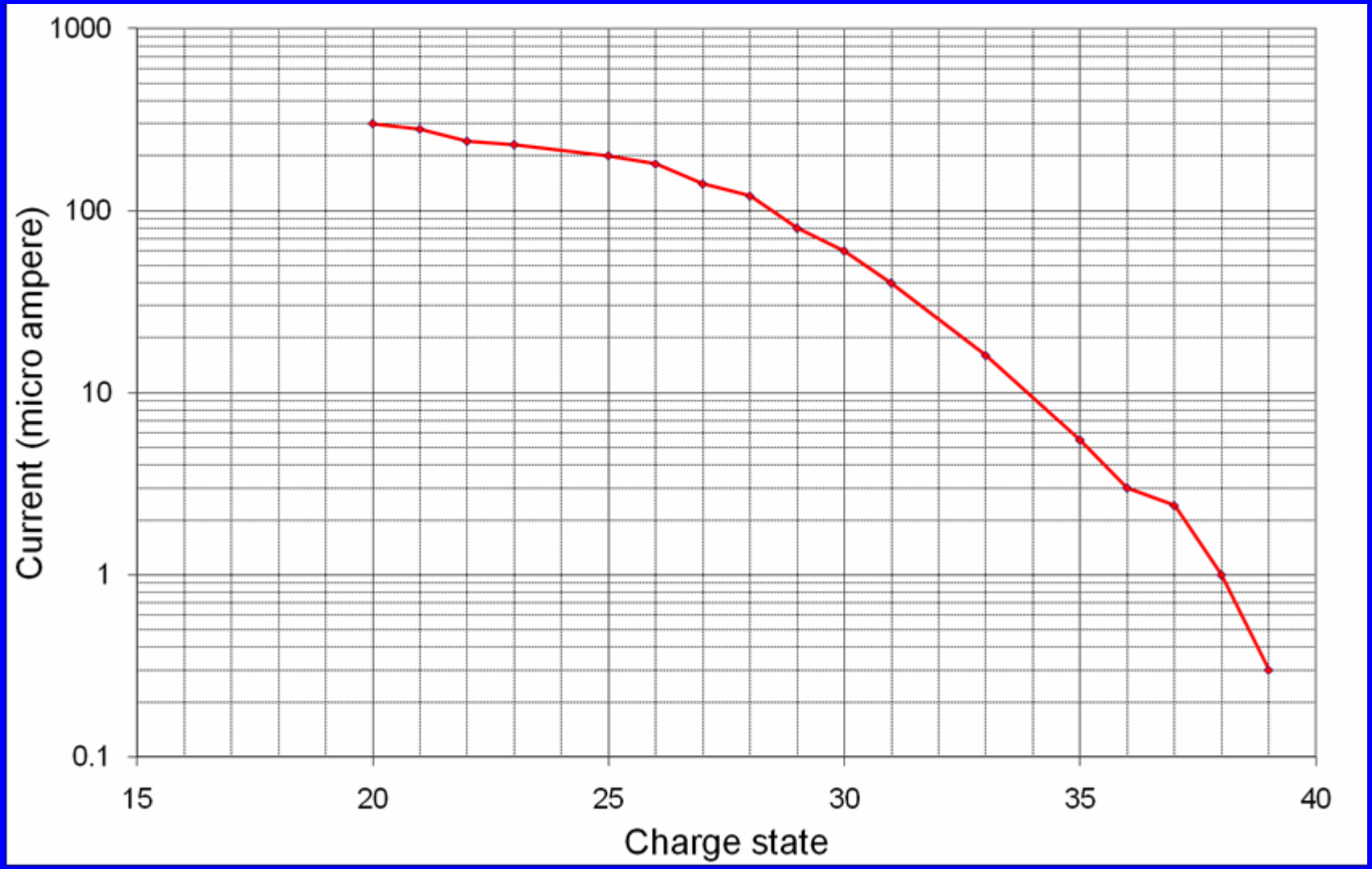
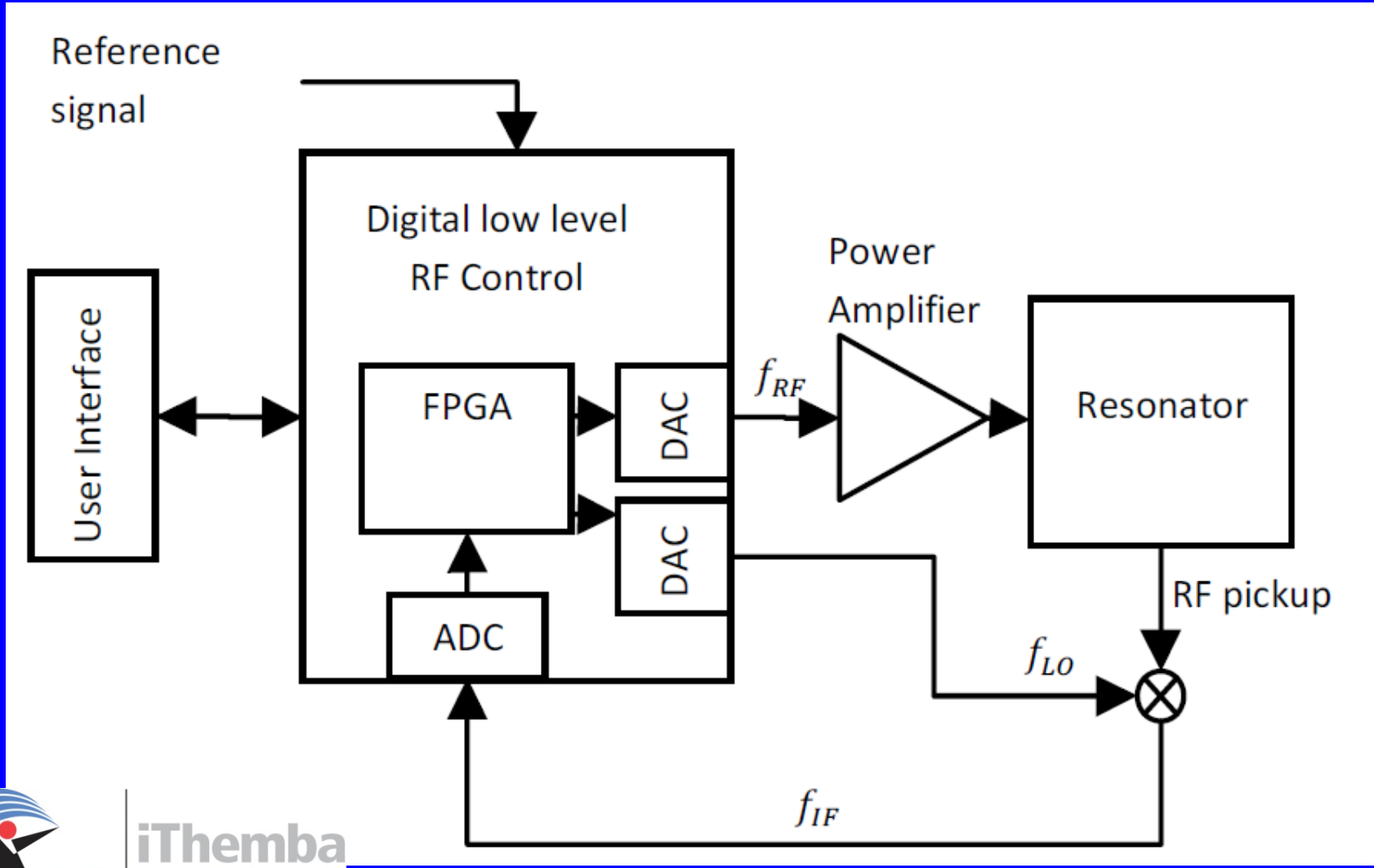
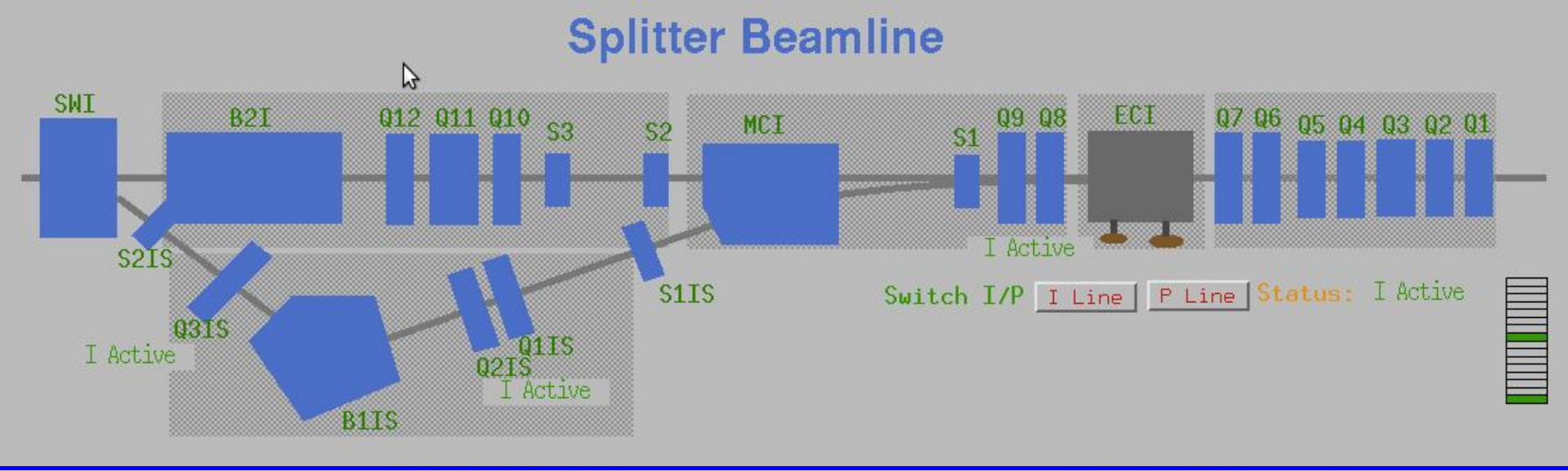
Beam current for the different charge states of xenon produced by the Grenoble test source (GTS2)



New Digital Low Level RF Control System





ECI I Line

Description Units

Reference Value

RefOff 0.000 ActOff 0.100
RefSlo 1.000 ActSlo 0.999

Actual Value

Status

ECI Volt kV

0 100 .1

Immed | Set&Enter | SET/ENTER | Enter

Control Power: ON OFF

High Voltage Pwr ON OFF 2kV

0.00

97.79

On

ECI Cur mA

0 5 .01 .001

Immed | Set&Enter | SET/ENTER | Enter

Cur Lim Shut Dn Enab: Enable .03uA

Cur Lim Mode: Not Sel CurLim

Shut Down Reset: Reset

RefOff 0.000 ActOff -0.002
RefSlo 1.000 ActSlo 1.010

0.000

0.005

Ok

Frame pos mm

0 0 .01

Immediate | Set&Enter | Enter

0.00

Presets: Out -50mm -40mm -30mm -10mm -5mm 0 IN

Steps: CW -1000 -100 100 1000 CCW

Abort

Brake ON Brake OFF

CW Limit: -39.70 CCW Limit:
LIMIT CLEAR LIMIT CLEAR

Ok

secon

1 second

Frame angle mm

0 0 .01

Immediate | Set&Enter | Enter

0.00

Presets: In 0mm 1mm 2mm 3mm 4mm 5mm OUT

Steps: CW -1000 -100 100 1000 CCW

Abort

Brake ON Brake OFF

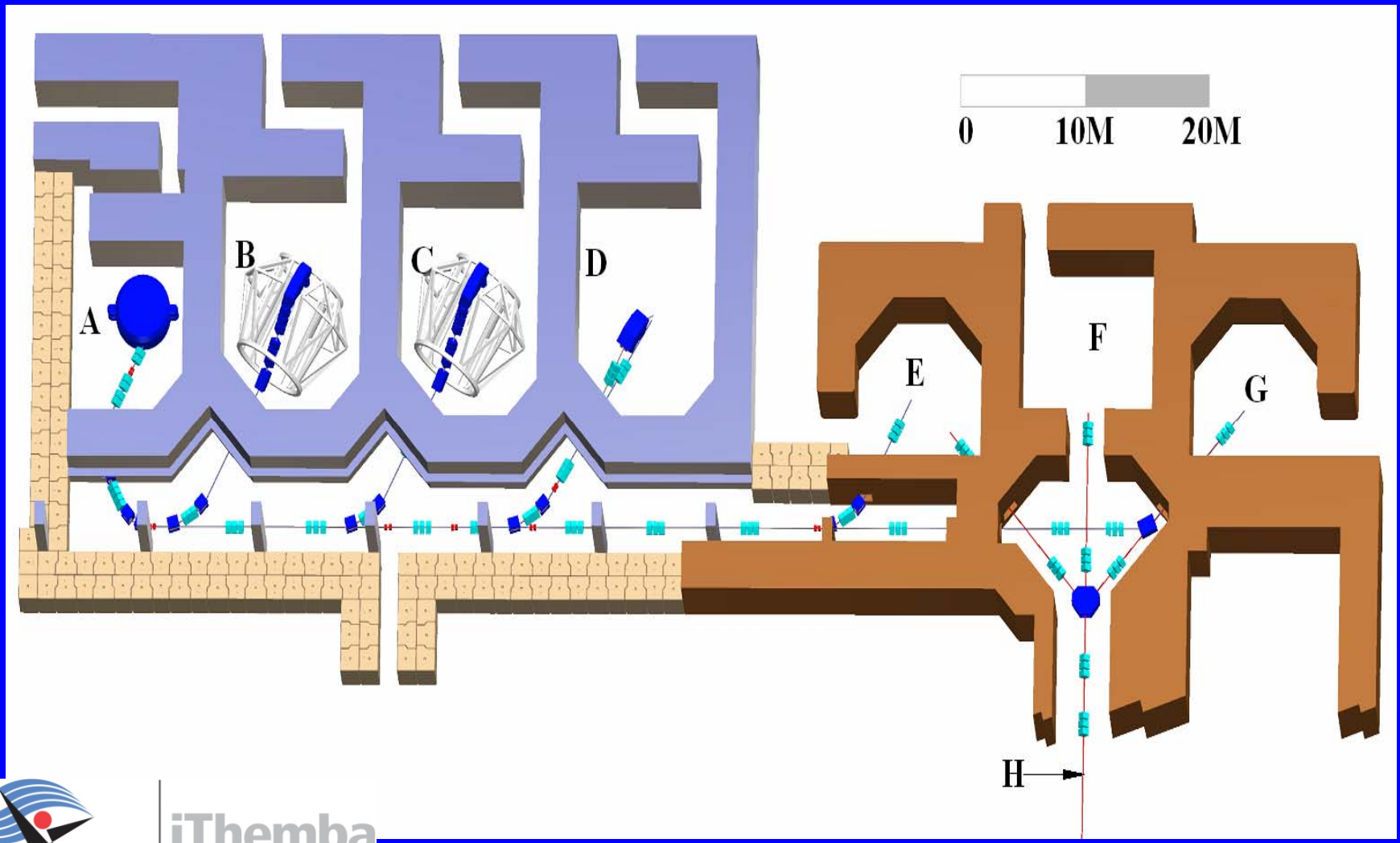
CW Limit: 0.23 CCW Limit:
LIMIT CLEAR LIMIT CLEAR

Ok

secon

1 second

Proposed dedicated facility for proton therapy



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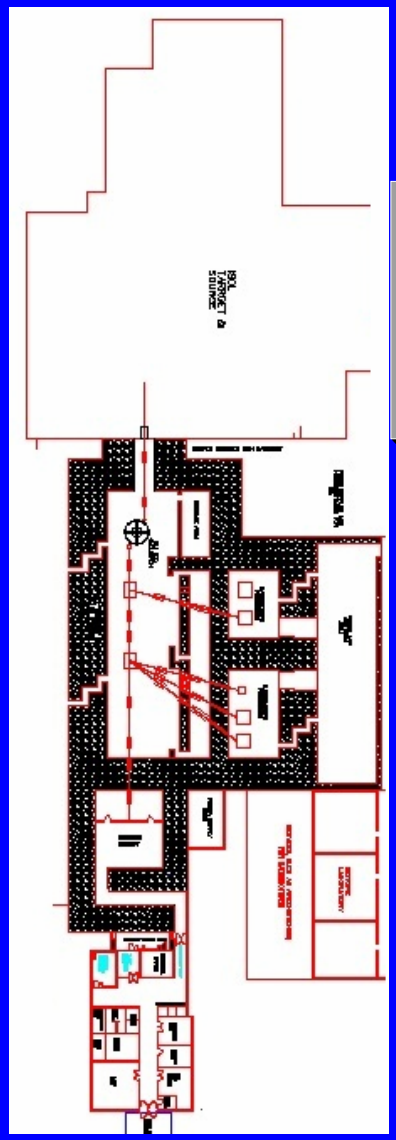
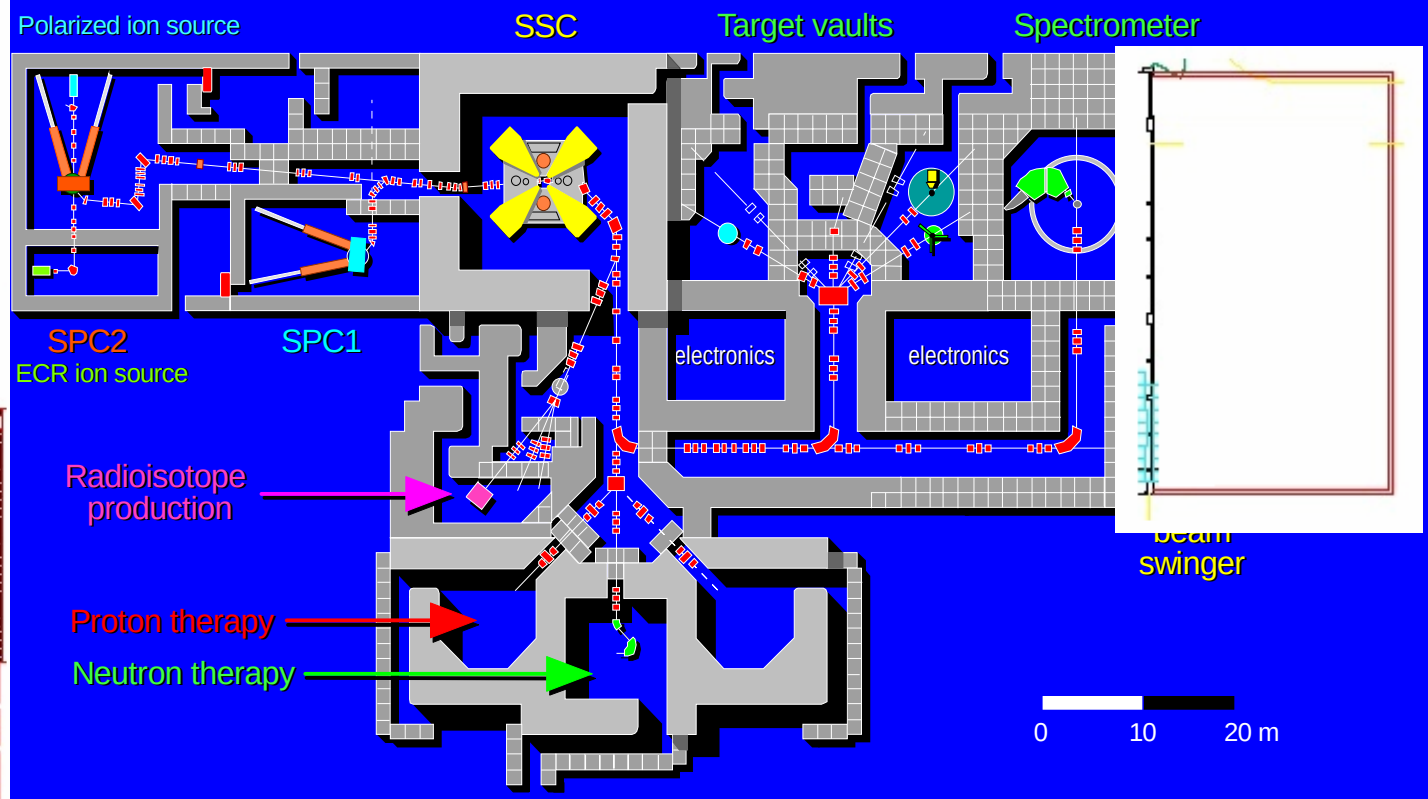
Proposed radioactive beam facility



Separated-Sector Cyclotron Facility



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Control room upgrade to monitor many more variables

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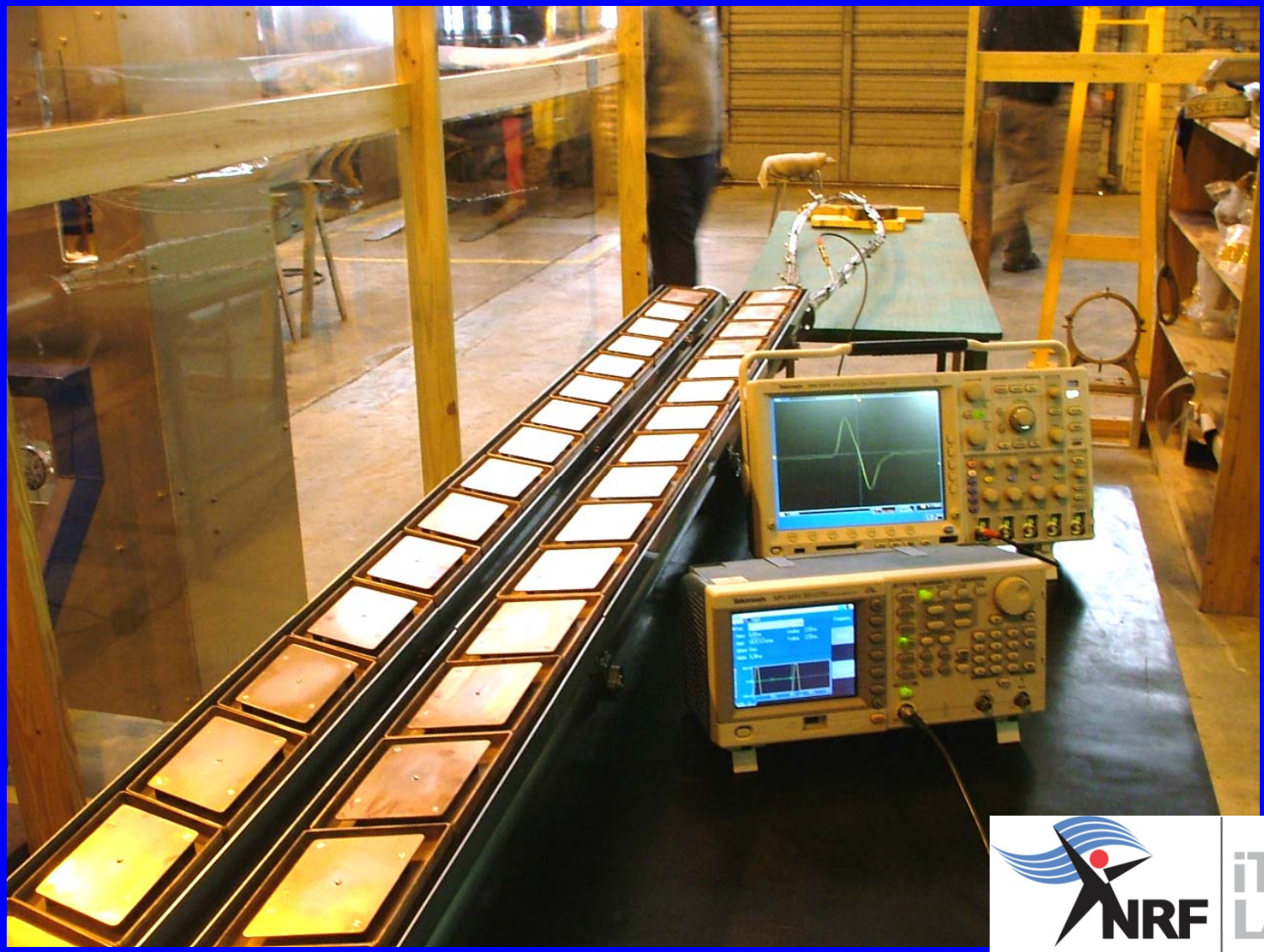
21 Fixed phase probes for the separated sector cyclotron



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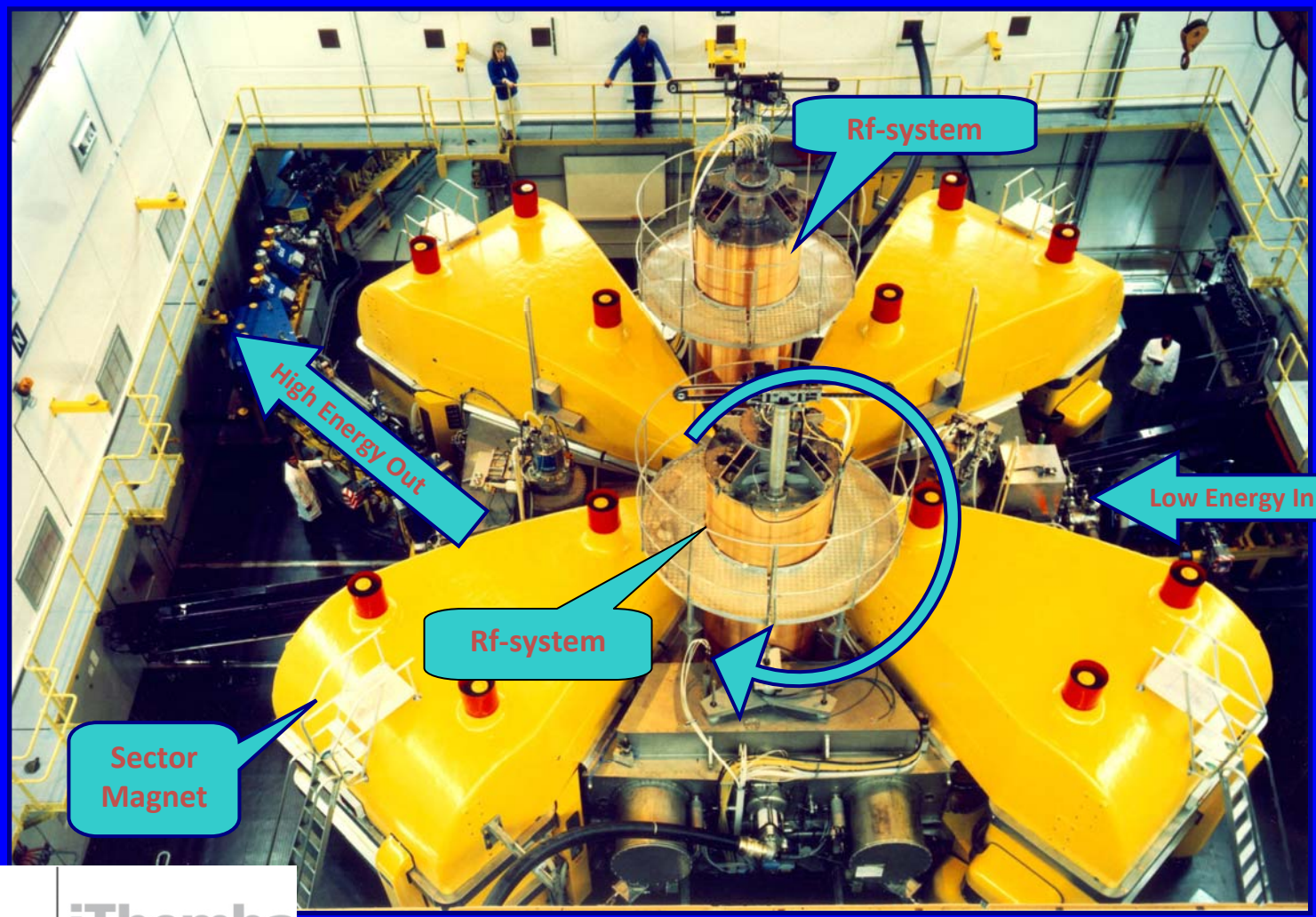
The Separated-sector cyclotron



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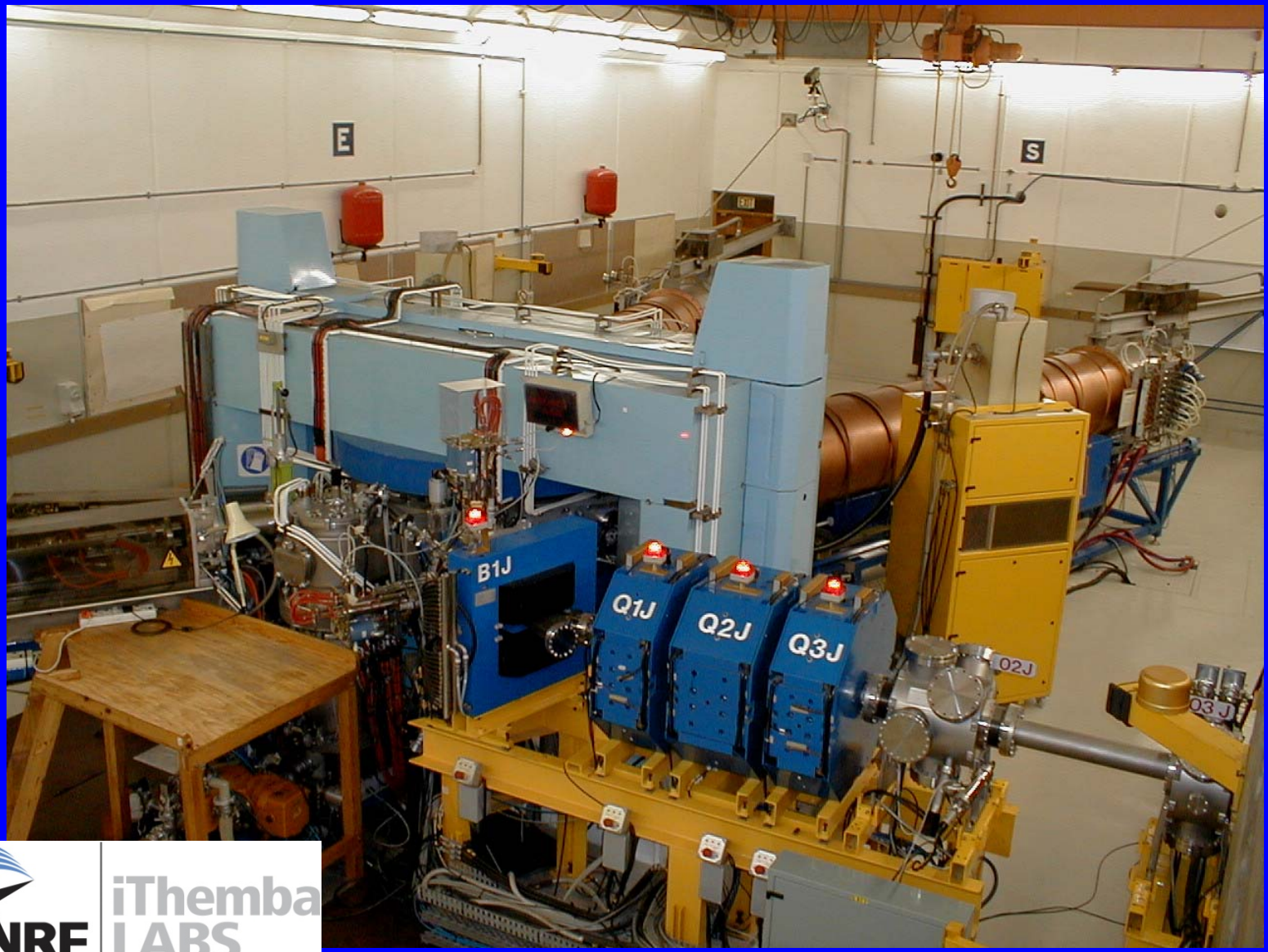
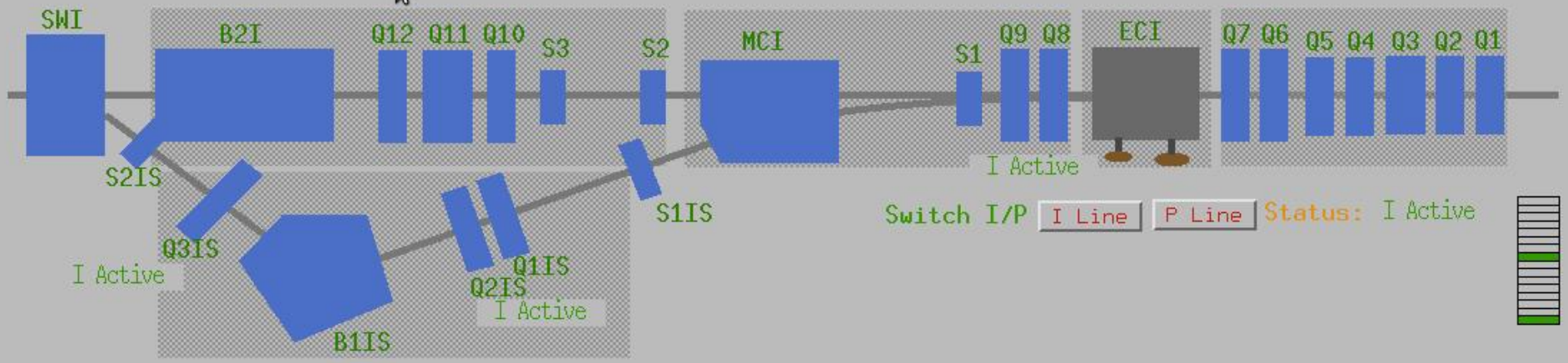
Solid-pole injector cyclotron 1



Splitter Beamline



Quads 1 - 5 I Line

Quad 1I	ON	OFF	0	Immed Set&Enter SET/ENTER Enter	170 .1	75.8	0.00 170.00	67.62	0.00 170.00	On
Quad 2I	ON	OFF	0	Immed Set&Enter SET/ENTER Enter	170 .1	95.2	0.00 170.00	87.82	0.00 170.00	On
Quad 3I	ON	OFF	0	Immed Set&Enter SET/ENTER Enter	170 .1	70.0	0.00 170.00	69.59	0.00 170.00	On
Quad 4I	ON	OFF	0	Immed Set&Enter SET/ENTER Enter	170 .1	63.2	0.00 170.00	62.65	0.00 170.00	On
Quad 5I	ON	OFF	0	Immed Set&Enter SET/ENTER Enter	170 .1	36.4	0.00 170.00	36.41	0.00 170.00	On
Quad 6, I Line	ON	OFF	A -100	IMMED ONLY	100 .1	89.8	0.00 170.00	89.22	0.00 170.00	+on
Quad 7I Quad 7, I Line	ON	OFF	A -100	IMMED ONLY	100 .1	71.1	0.00 170.00	71.02	0.00 170.00	+on