

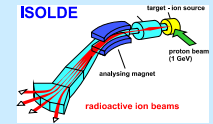
HIE-ISOLDE 2005-2011

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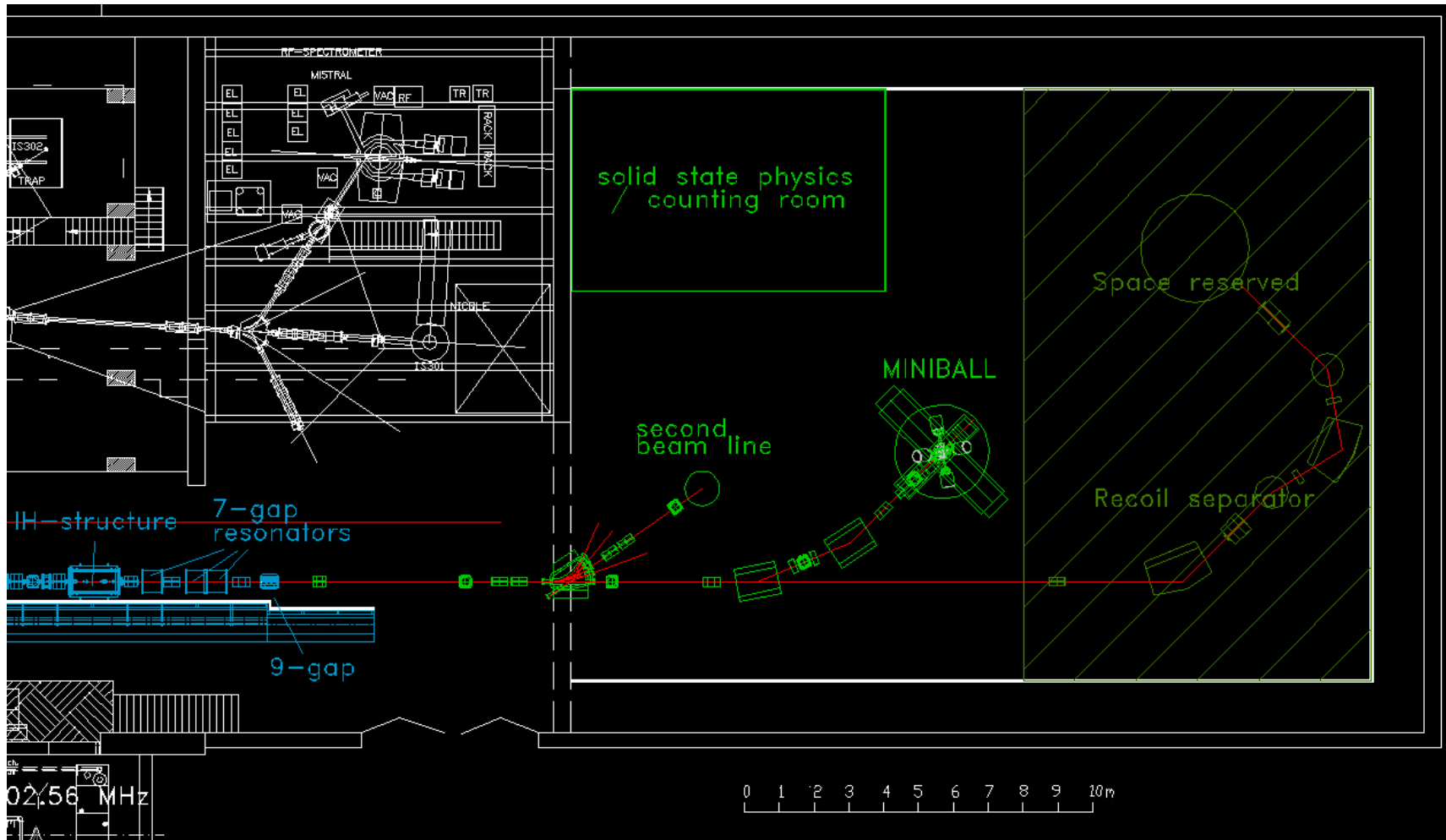
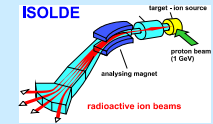
Objective



- Up-grade of ISOLDE facility - technical objectives
 - To benefit from injector upgrades as CERN
 - 900 ms cycling of PSB
 - Linac 4: fission fragments at 160 MeV/u?
 - To increase the energy and intensity of REX-ISOLDE
 - TRAP/EBIS upgrades and possible ECR source in parallel
 - First stage to 5.5 MeV/u
 - Second stage to 10 MeV/u
 - To improve the beam quality at ISOLDE
 - Controlled time structure, smaller transverse emittance and lower energy spread
 - High charge state beams for more Users



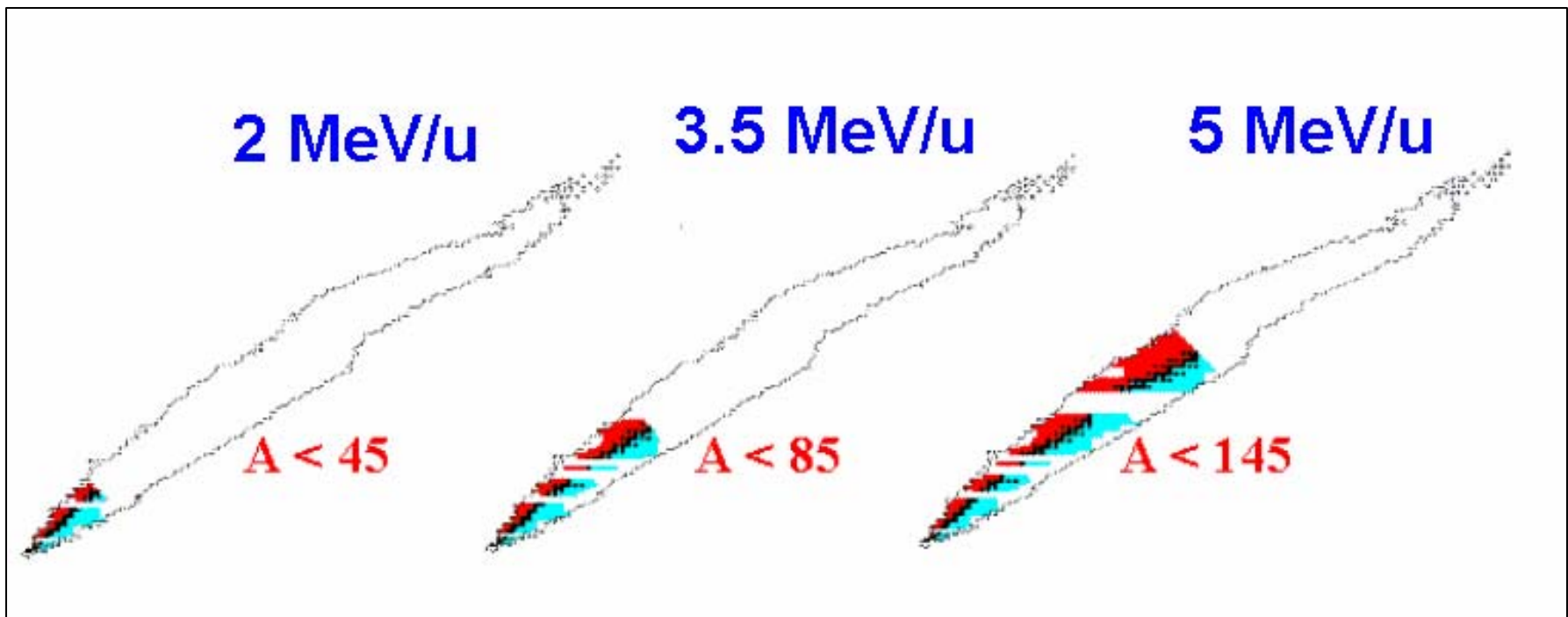
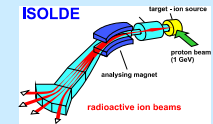
linac



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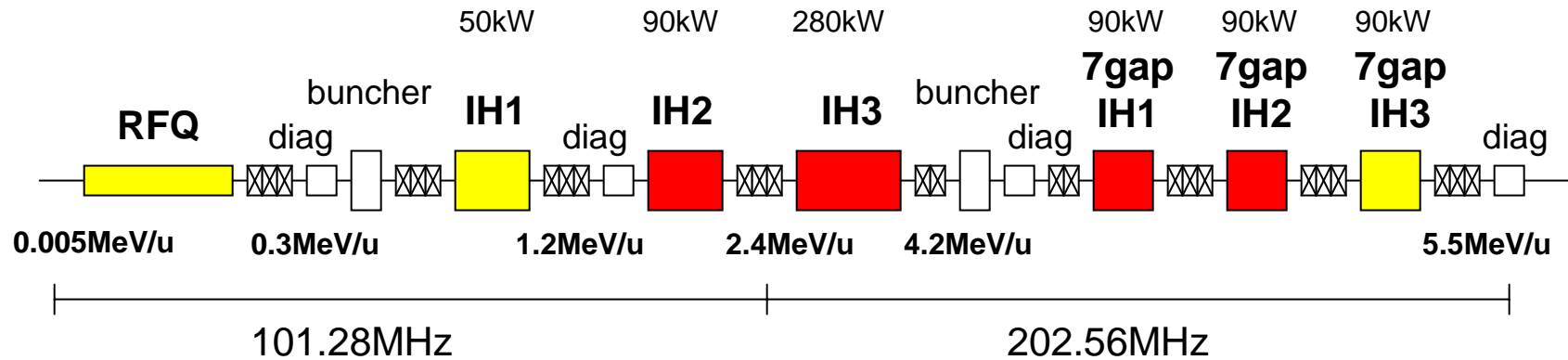
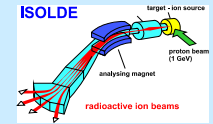


Reach of high energy RIB





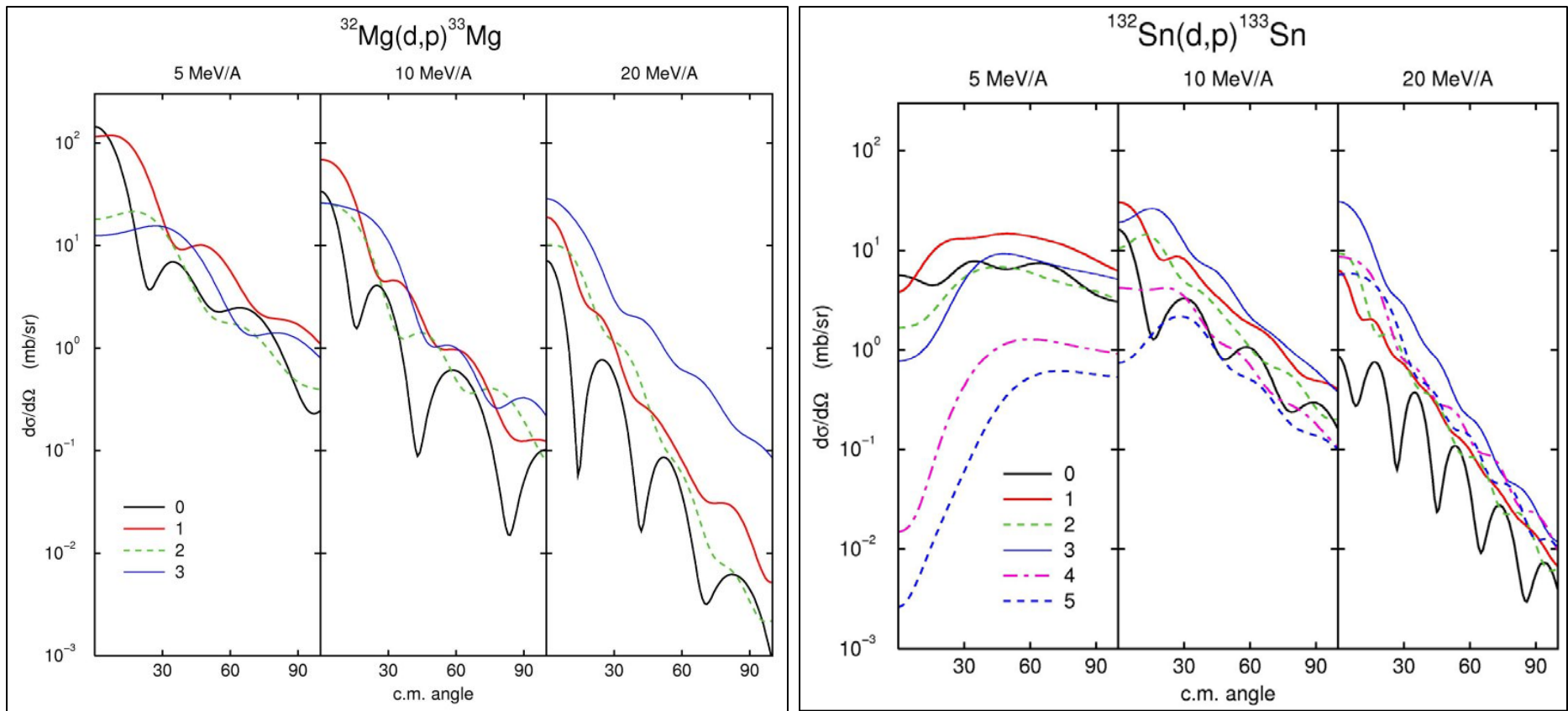
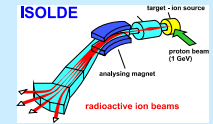
Linac: 5.5 MeV/u - IH option



	IH2	IH3	IH 7gap 1	IH-7gap2	IH-7gap3	price of components
rf-Amplifier	0	230	200	200	0	630
Low level rf-modules + SIMATIC, crates	0	20	20	20	0	60
electronics (vacuum, control, SIMATIC, PCs, ADCs, DACs, Profibus)	0	20	20	20	0	60
vacuum system (valves, gauges, pumps)	40	40	20	20	10	120
tuning plungers, structure	10	15	10	10	5	45
resonator tank (material and production)	150	150	90	90	0	480
cooper plating (tank, structure)	15	20	15	15	0	65
support stands	5	5	5	5	5	20
magnetic lenses+power supply	50	50	50	50	0	200
price of the structures	270	550	430	430	20	1680



Transfer reactions at high energy

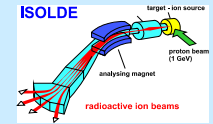


W.N. CATFORD SURREY

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Linac: 10 MeV/u - ISTC option



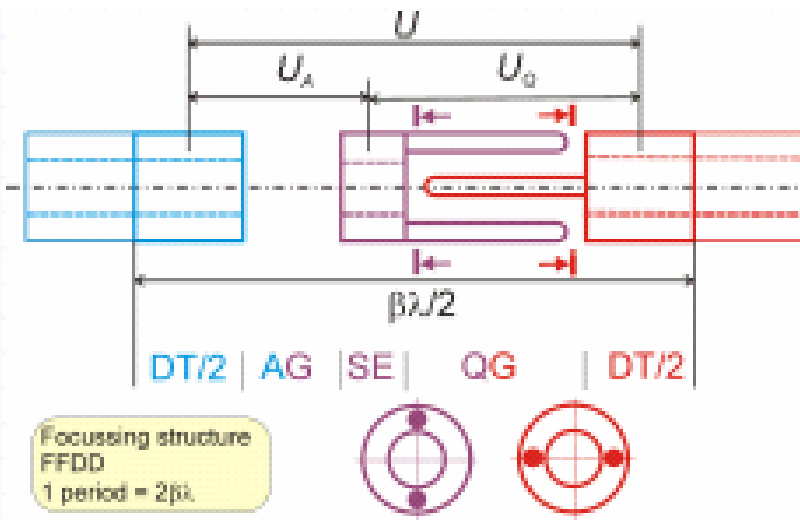
Proposed by IHEP:

„An RFQ DTL Section driven at H-mode of RF Oscillations.

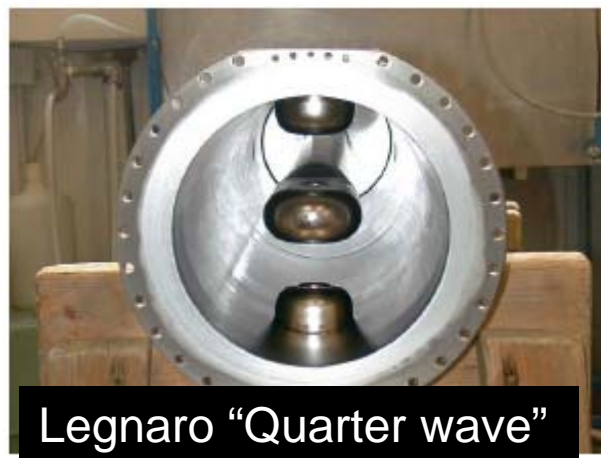
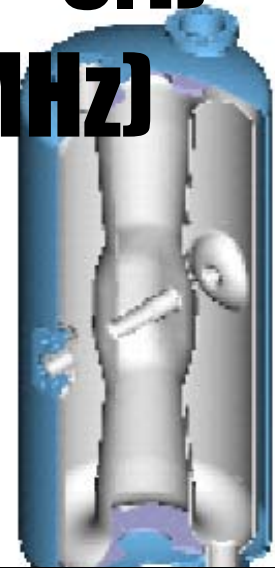
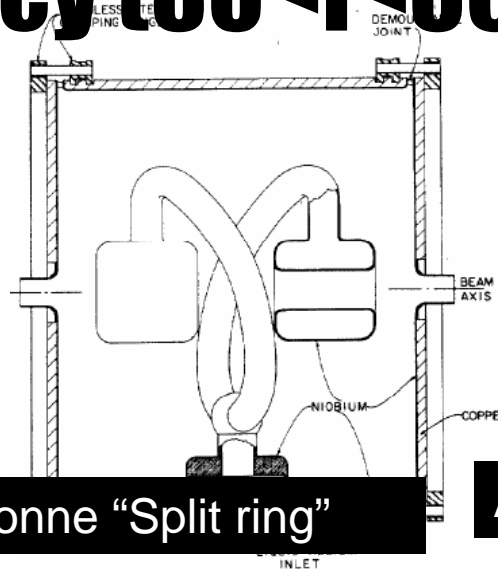
Transverse Focusing period $2\beta\lambda$, Pattern FFDD. Effective acc.

Voltage around 4 MV/m. Aperture Hole Diameter 10 mm. Normalized transverse Acceptance $3-4\pi$ mm mrad“.

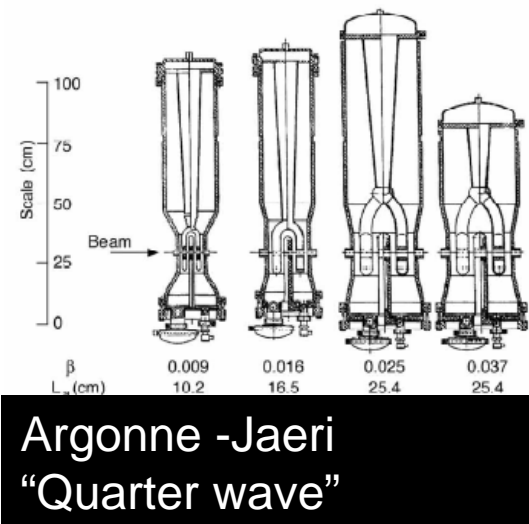
⇒ 5.5 - 10 MeV/u: Two 3.5 m Tanks, rf-Power: 500 kW/Tank



Low energy SC cavities ($0.01 < \beta < 0.1$) at low frequency ($80 < f < 350$ MHz)



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An attempt of cost estimate - to be verified

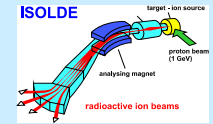
SC LINAC MEDIUM β	<i>CAVITIES</i>	1160000
	<i>CRYOSTATS</i>	1025000
	<i>PROTOTYPE</i>	100000
	<i>QUADRUPOLES</i>	340000
	<i>VACUUM</i>	200000
	<i>AMPLIFIERS</i>	200000
	<i>CONTROLS</i>	150000
	<i>RF CONTROLS</i>	100000
	<i>DIAGNOSTICS</i>	100000
	<i>SERVICES</i>	125000
	<i>SAFETY</i>	100000
		3600000 CDN

This was a cost estimation for 20 cavities, 5 cryostat and a prototype for the ISAC-II linac. Recent result show that the cost of the cavity can be reduced by using sputtered Nb on copper cavity.

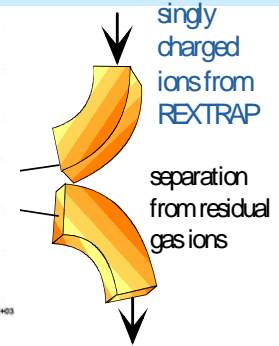
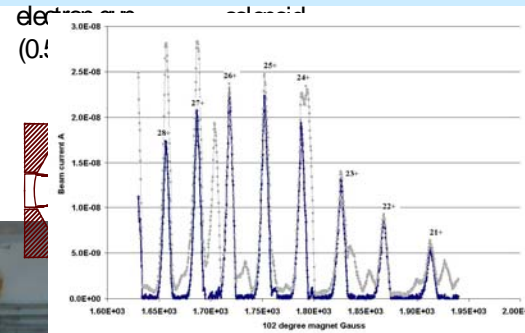
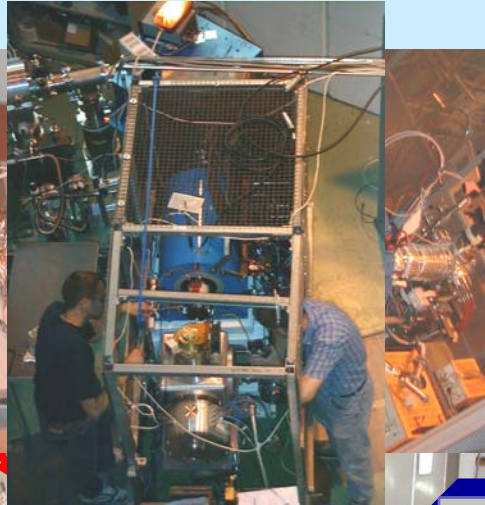
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REX Trap - EBIS - ECR



REX EBIS



For A > ?:

IS 397 team

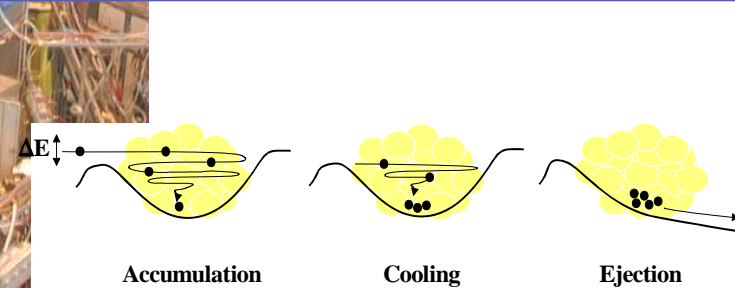
Charge breeding of Uranium and $^{96}\text{Sr}^{15+}$, $^{94}\text{Rb}^{15+}$



q/A-selector

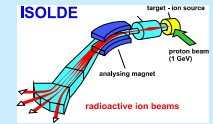
REXTRAP

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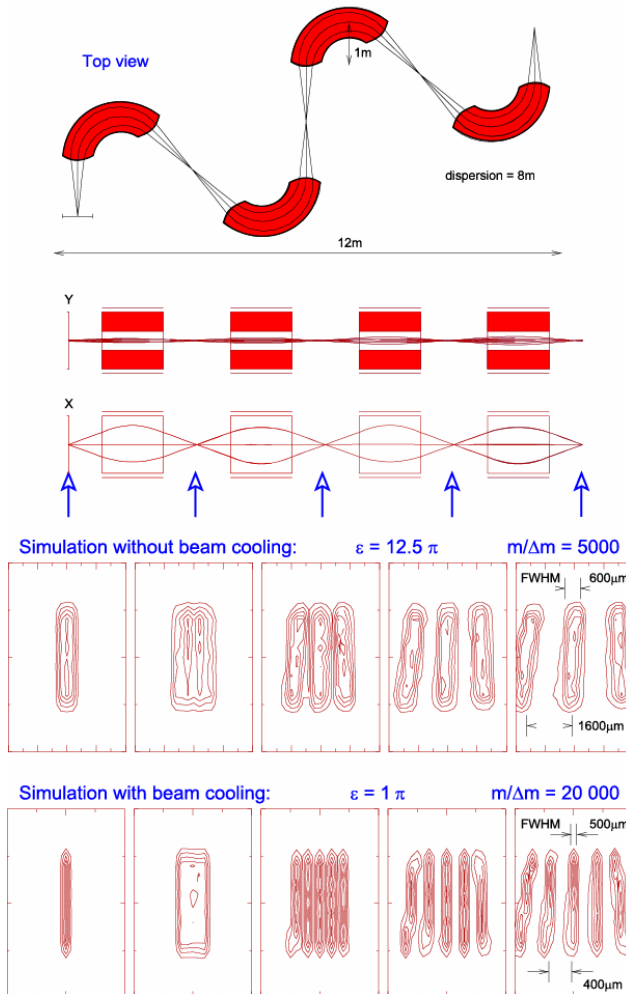




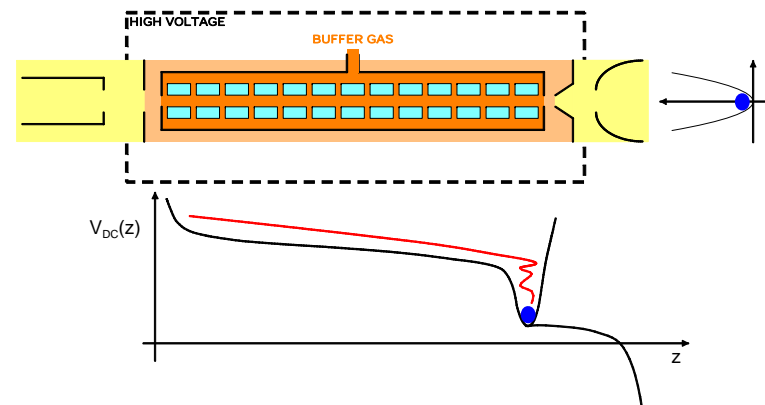
Beam quality: New HRS and RFQ cooler



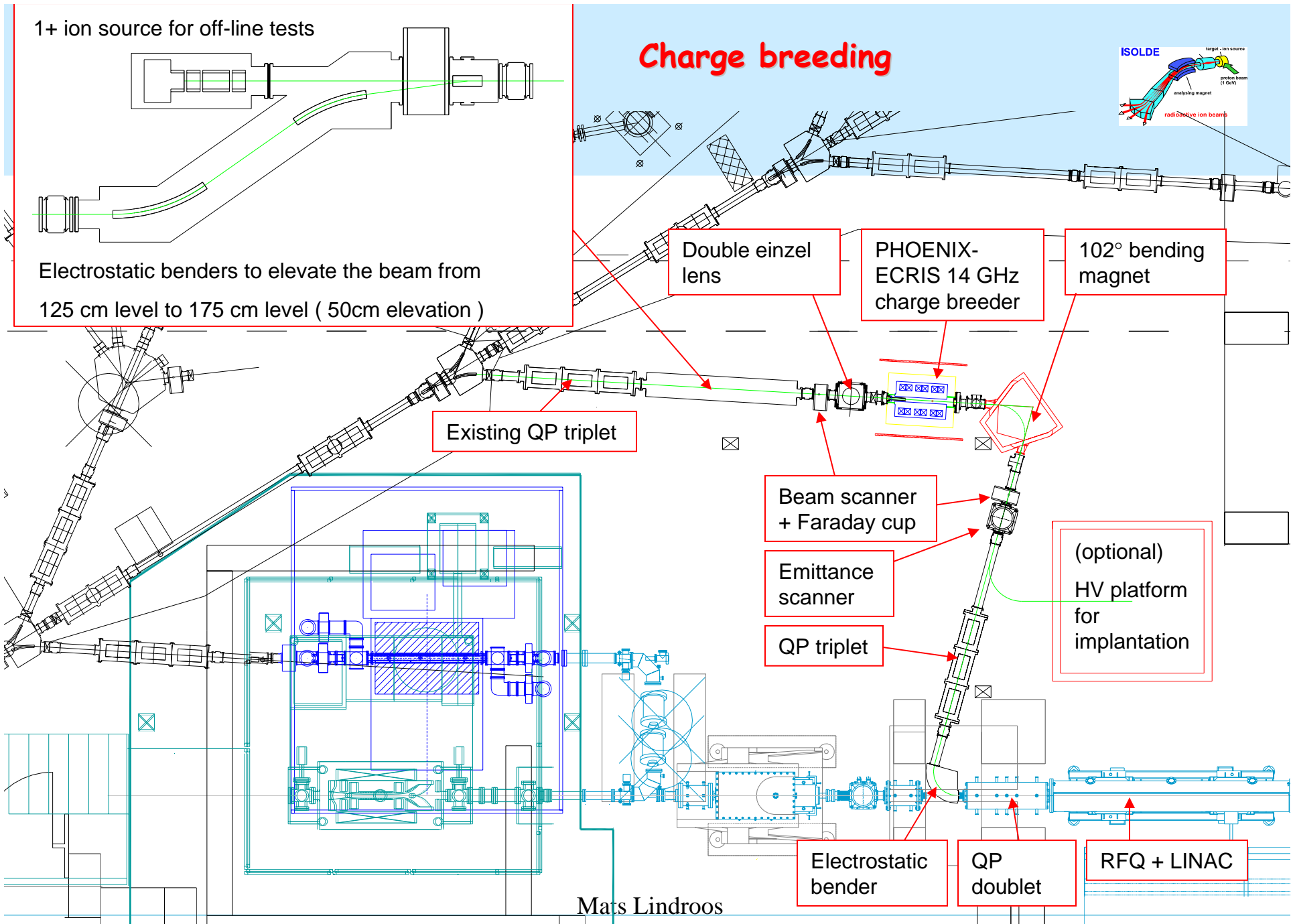
High resolution mass spectrometer, 4 dipole magnets



- "Isobaric" separation
- Separation limited by the beams transverse size
- Cooling at low energy with RFQ cooler

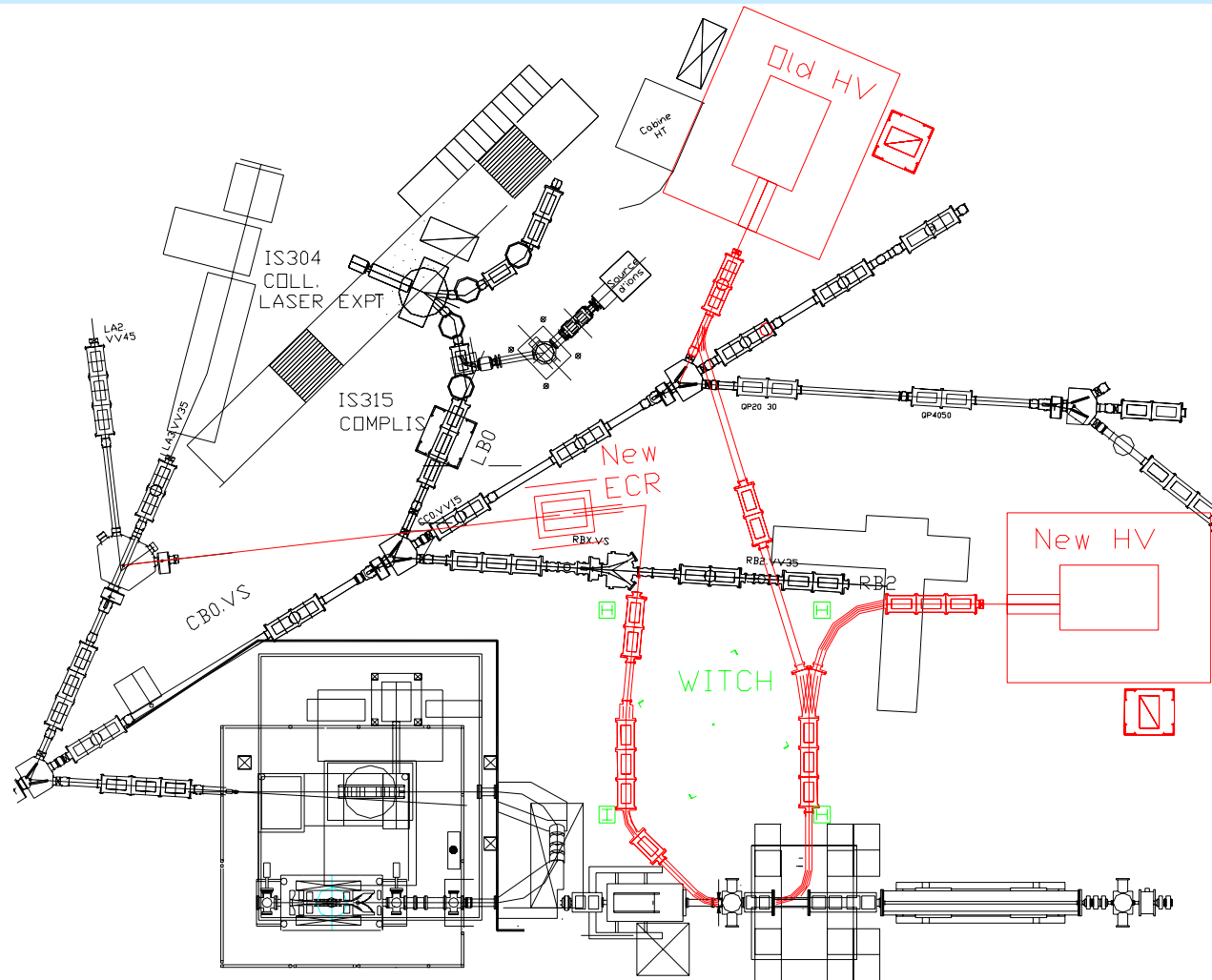
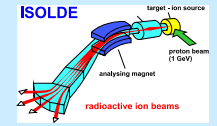


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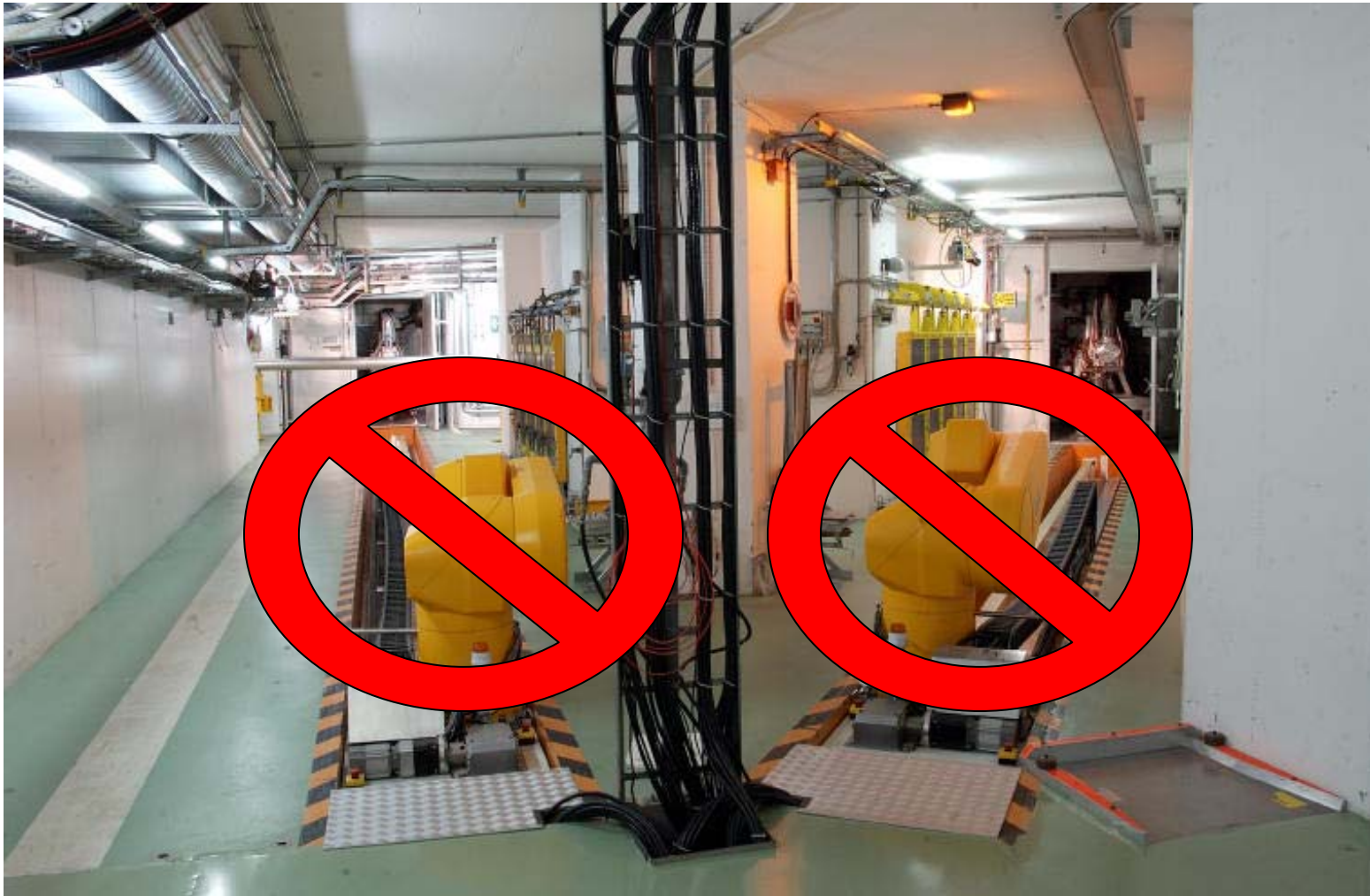
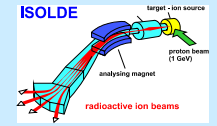
High charge state beam-line



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Target handling and safety (10 microAmps)



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Targets: Higher power and fission fragments

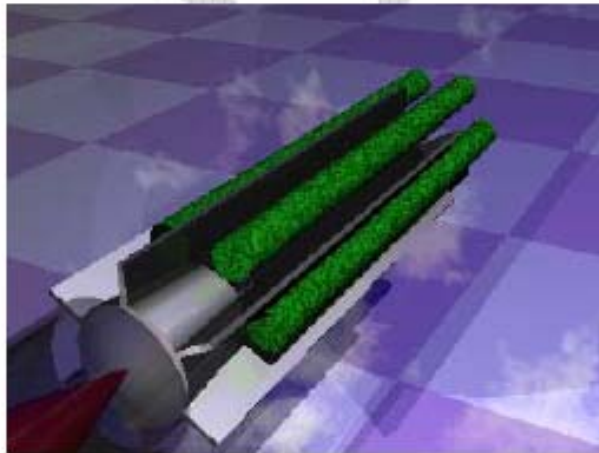
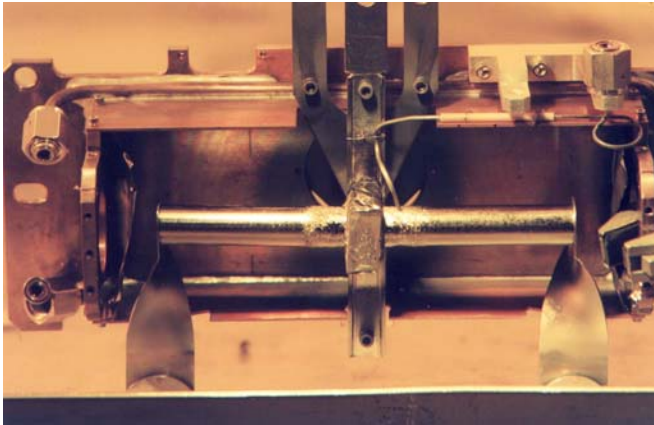
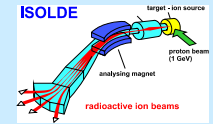
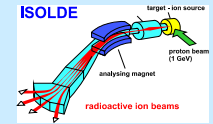


Fig.1 Schematic layout of the n-converter/target configuration

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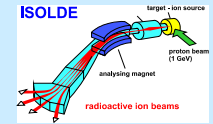
RILIS improvements



- New RILIS pump lasers
 - Solid state laser to replace CV lasers without degrading performance
 - Installation in shutdown 2006-2008
 - Replacing dye lasers with Ti:sapphire lasers or other solid-state lasers
 - LIST for ISOLDE
- Off-line lab for new developments and atomic spectroscopy research
 - Under installation
- External grants
 - 2.4 MCHF from Wallenberg in Sweden
 - BMBF application submitted for LIST



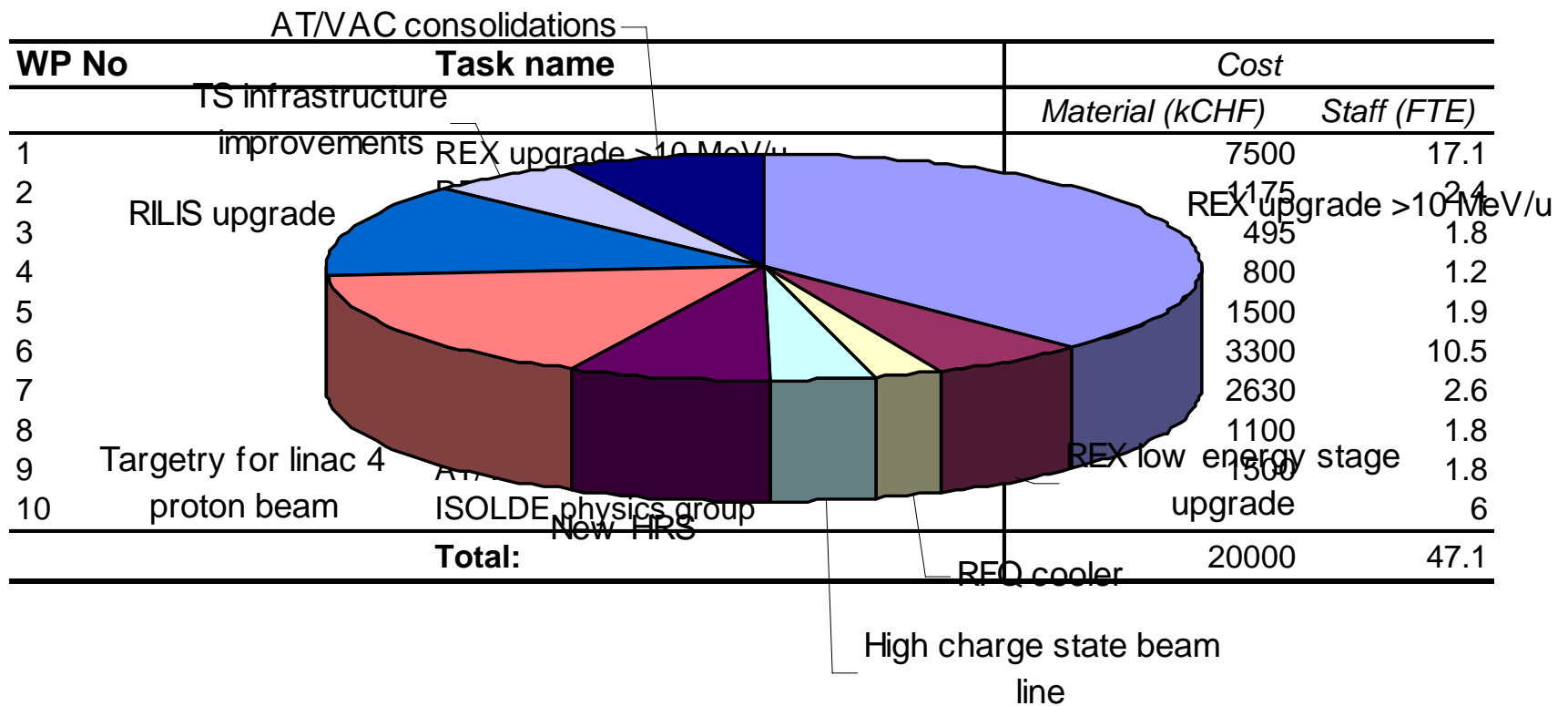
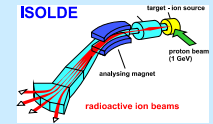
Infrastructure



- Technical Services
 - Second transformer for ISOLDE to assure non-interrupted operation during maintenance of transformers
 - Ventilation for extension
 - Cooling for REX upgrades and new experiments
- Vacuum group
 - Replacement of vacuum controls with new standard control units
 - Increase recovery tank capacity and connect RFQ cooler, REX trap and EBIS (ECR?)

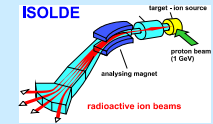


Budget: overview





HIE-ISOLDE budget



Total material cost (kCHF):	20000								
Total external (kCHF):	6355								
Total CERN (kCHF):	13645								
Year:	2004	2005	2006	2007	2008	2009	2010	2011	
Annual external:	255	280	2000	1900	1000	320	300	300	
Annual CERN:	0	20	625	1950	2900	3350	2750	2050	
Annual totals:	255	300	2625	3850	3900	3670	3050	2350	

Total personyear:	47.1								
Year:	2004	2005	2006	2007	2008	2009	2010	2011	
Annual staff in personyear:	0.9	2.1	3.8	8	9.3	8.8	7.1	7.1	

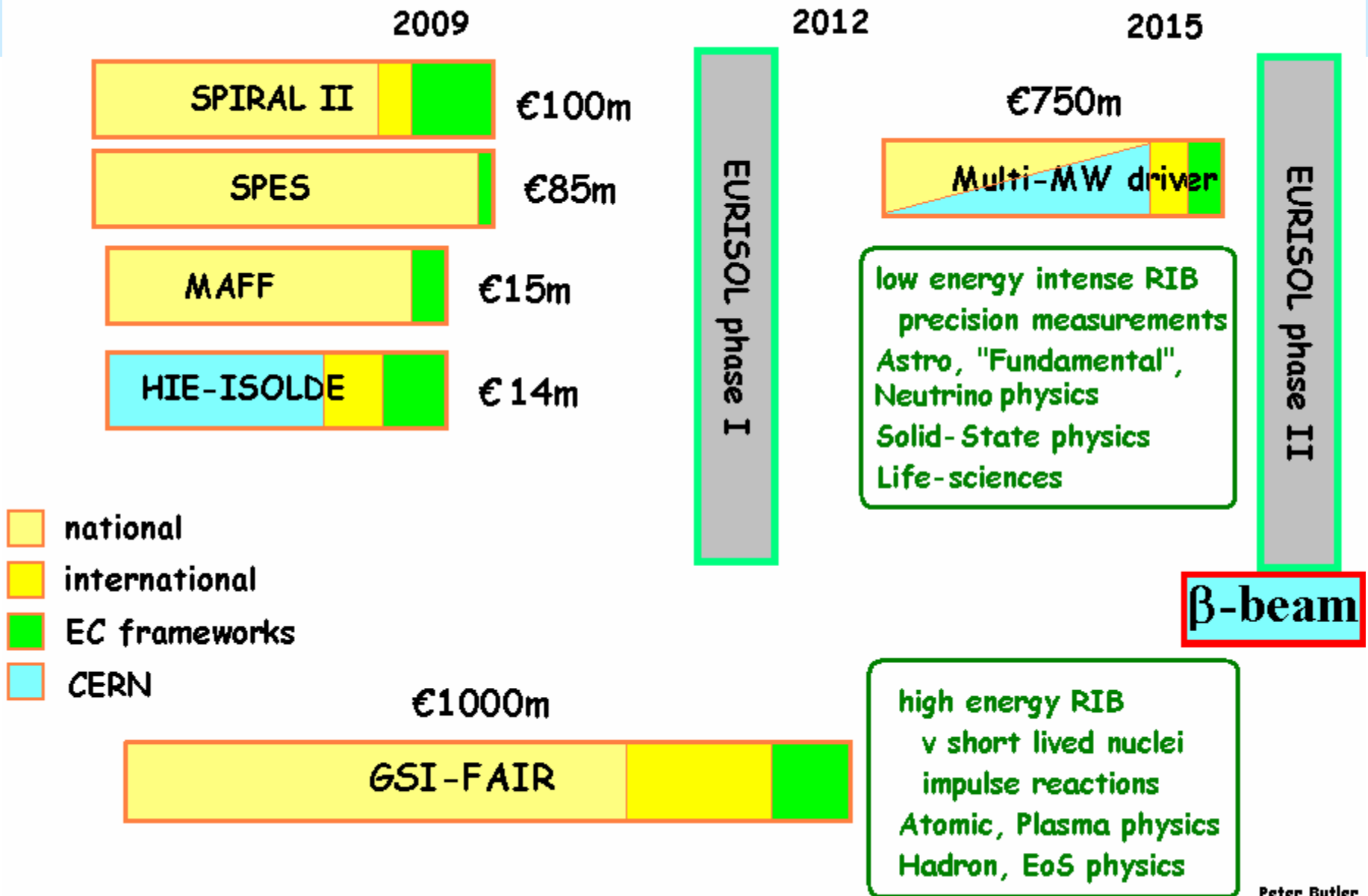
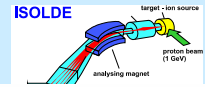
All costs in kCHF

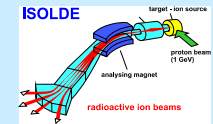
External contributors	Material (kCHF)	Comment
ISOLDE collaboration		1500 Available from 2006
IKS Leuven, BE		850 Approved
IKS Leuven, BE		1000 Application being prepared
EPSCR, UK		255 Approved
VR, SE		2400 Approved
BMBF, D		350 Design study already approved
Total		6355

Associated approved prc	Material (kCHF)	Staff (FTE)
EURISOL DS Targets	100	7
EURISOL DS Safety		2
EURISOL DS Beampreparation		3
EURONS chargebreeding		1
EURONS mass separators		1
Total	100	14

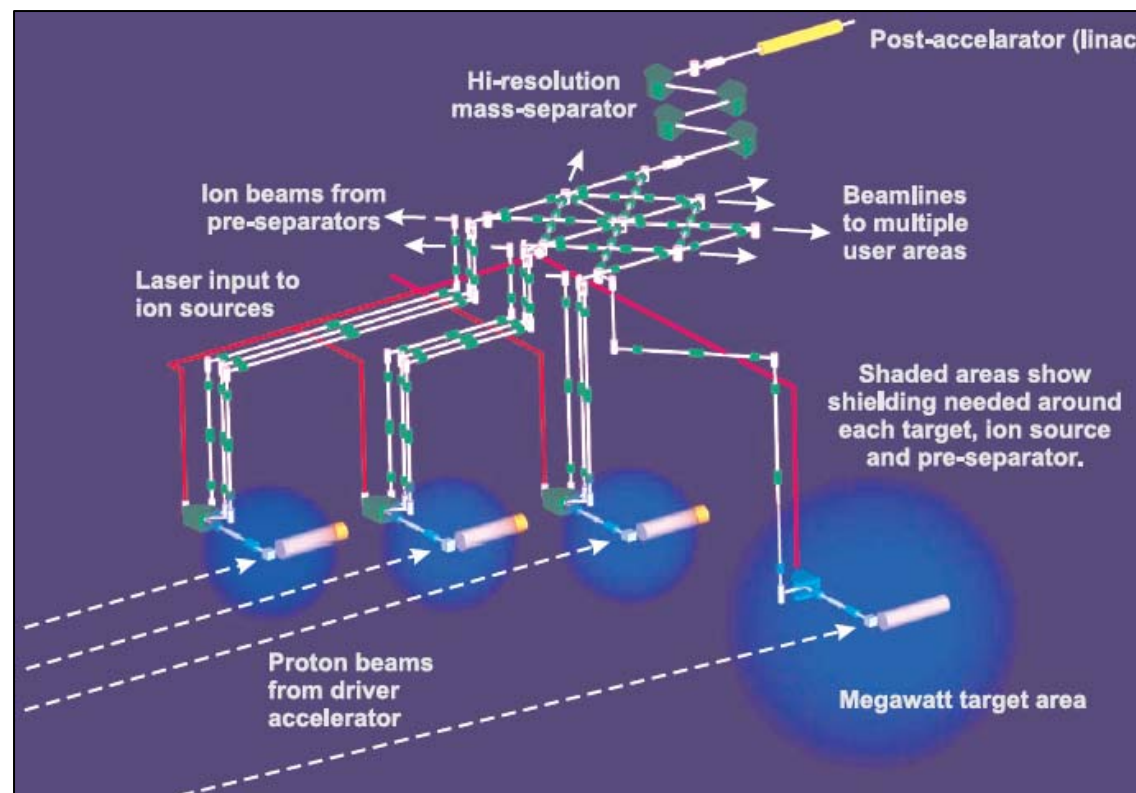
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European Roadmap for RIB facilities



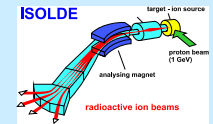


100kW direct production
5 MW spallation n target
→ 100 MeV/u RIB





Summary



- The HIE-ISOLDE project proposal will be presented for Research Board 8 June 2005
- The proposal preparation in full progress in the AB department
 - Review of linac technology before 1 May 2006
 - Presentation for ABMB 15 May
 - Decision for some REX staff required before RB meeting
- All external grants will improve the chances of getting the project approved