The EURISOL DESIGN STUDY PROPOSAL

The writing group:

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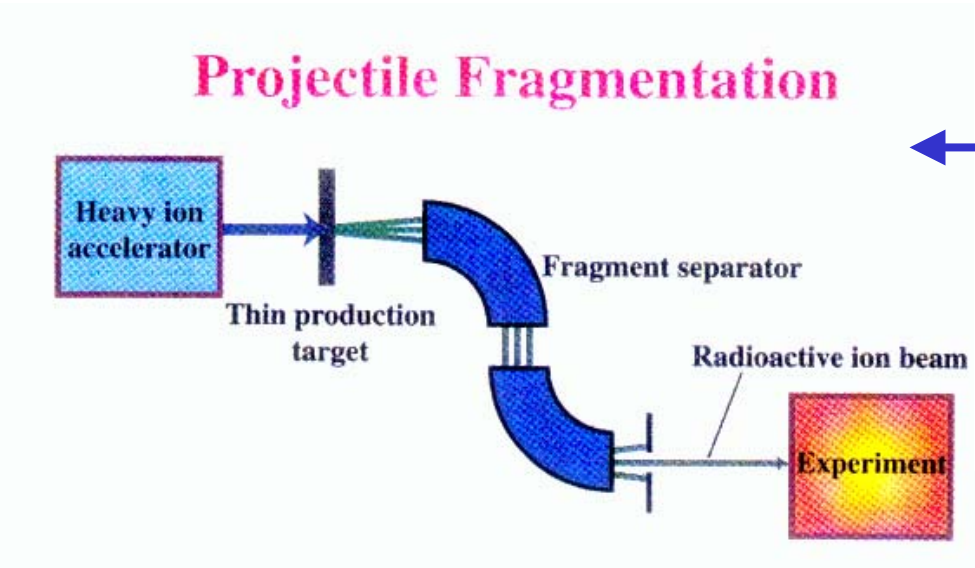
The Physics Program

- Nuclear structure far from stability (Gelletly, Aystö)
- Nuclear Dynamics and the nuclear EOS (Gulminelli)
- Nuclear Astrophysics (Kratz)
- Fundamental interactions and symmetries (Jungmann)

and

- Neutrino physics with β-beams

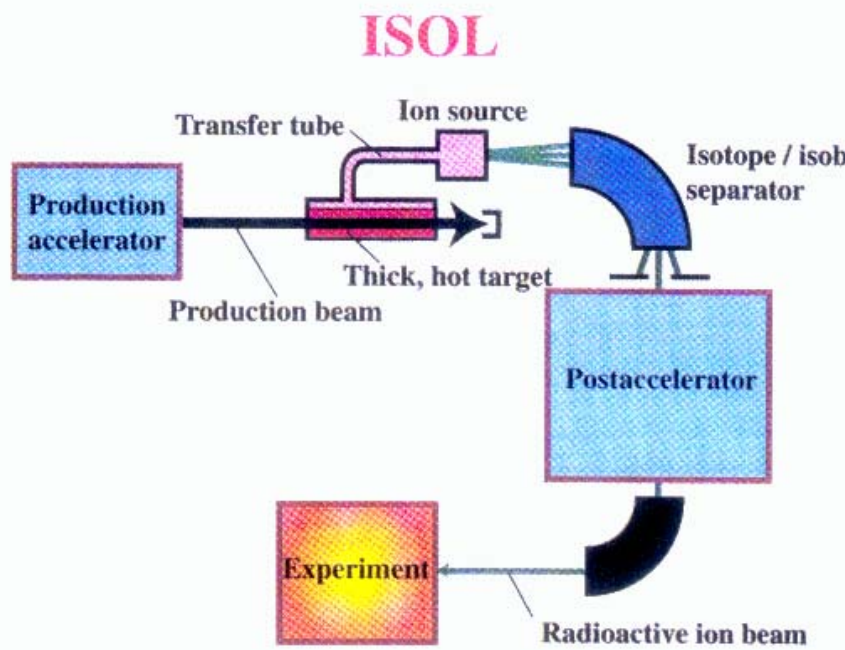
Radioactive beam production: Two complementary methods



GANIL/SISSI, GSI, RIKEN, NSCL/MSU

High energy, large variety of species, Poor optical qualities

GANIL/SPIRAL, REX/ISOLDE, ISAAC/TRIUMF



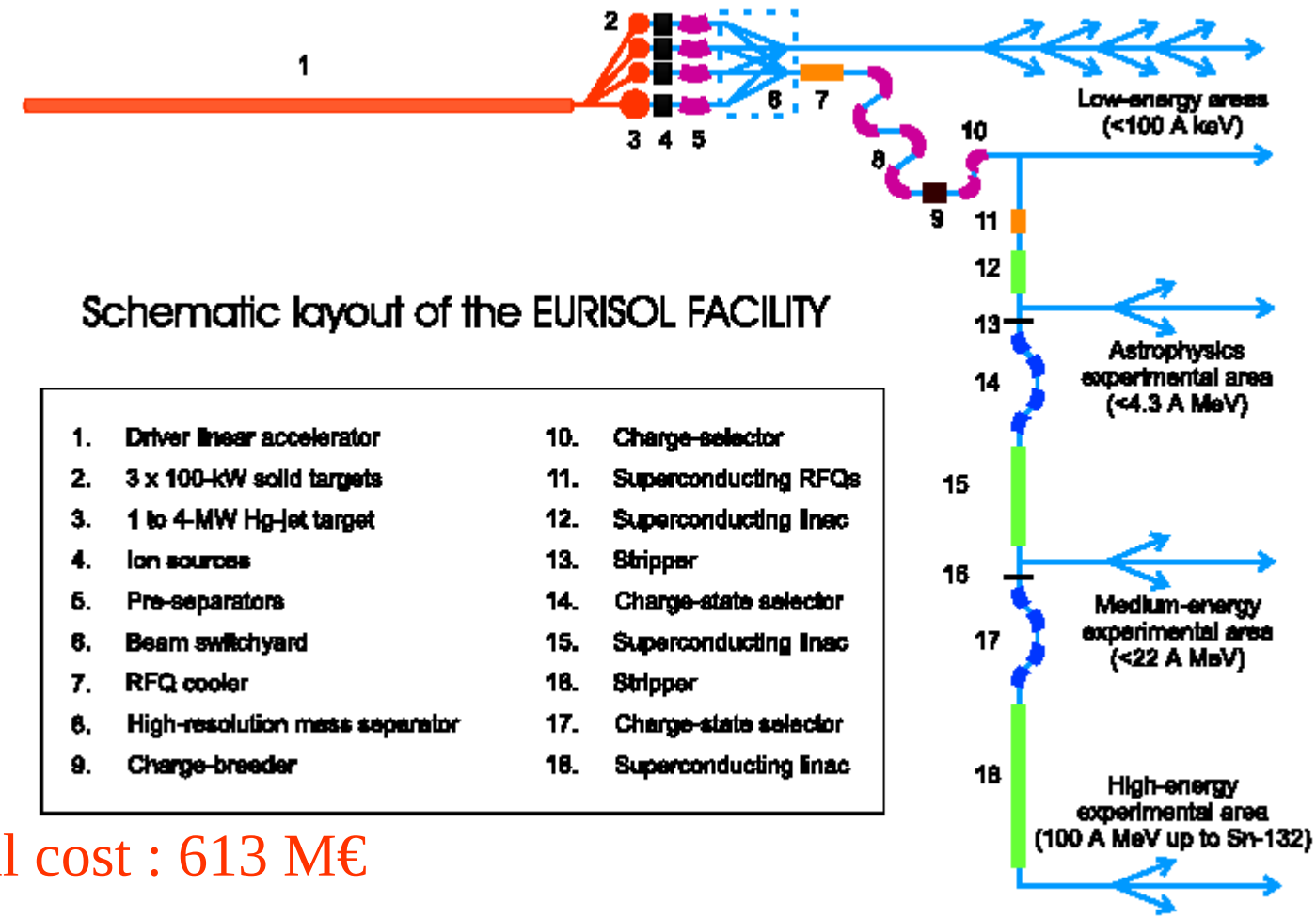
Low energy, chemistry is difficult, good beam qualities

NuPECC recommends the construction of 2 ‘next generation’ RIB infrastructures in Europe, i.e. one ISOL and one in-flight facility. The in-flight machine would arise from a major upgrade of the current GSI facility, while EURISOL would constitute the new ISOL facility

The EURISOL RTD in the 5th Framework (2000-2003)

- Coordinated by GANIL and Jean Vervier
- 11 institutions from 8 countries
- 5 working groups
  - Key experiments
  - Driver accelerator
  - Targets and ion source
  - Mass separator and post accelerator
  - Instrumentation
- http://www.ganil.fr/eurisol

The Eurisol Concept



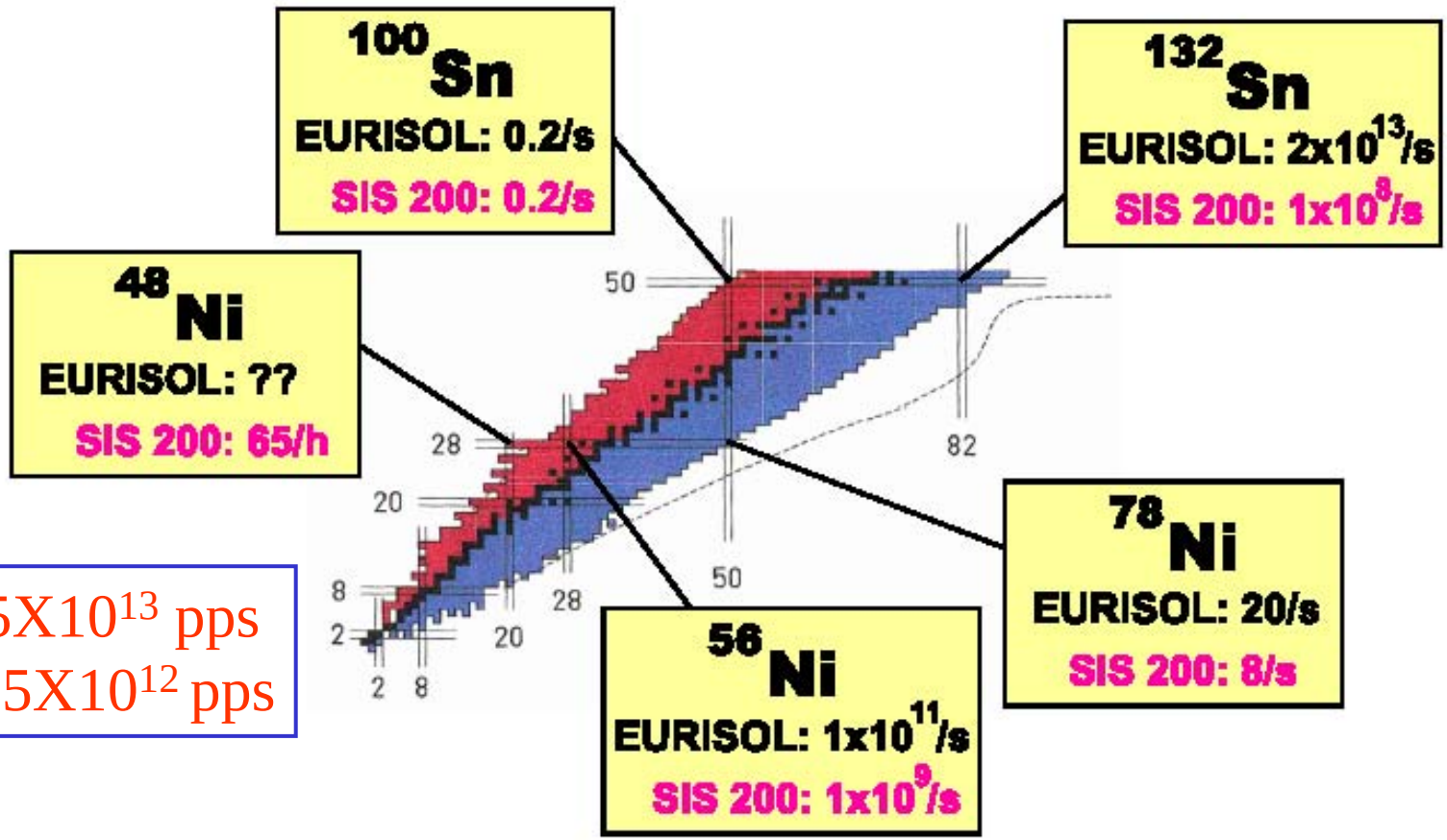
Schematic layout of the EURISOL FACILITY

1.	Driver linear accelerator	10.	Charge-selector
2.	3 x 100-kW solid targets	11.	Superconducting RFQs
3.	1 to 4-MW Hg-jet target	12.	Superconducting linac
4.	Ion sources	13.	Stripper
5.	Pre-separators	14.	Charge-state selector
6.	Beam switchyard	15.	Superconducting linac
7.	RFQ cooler	16.	Stripper
8.	High-resolution mass separator	17.	Charge-state selector
9.	Charge-breeder	18.	Superconducting linac

Total cost : 613 M€

Some beam intensities

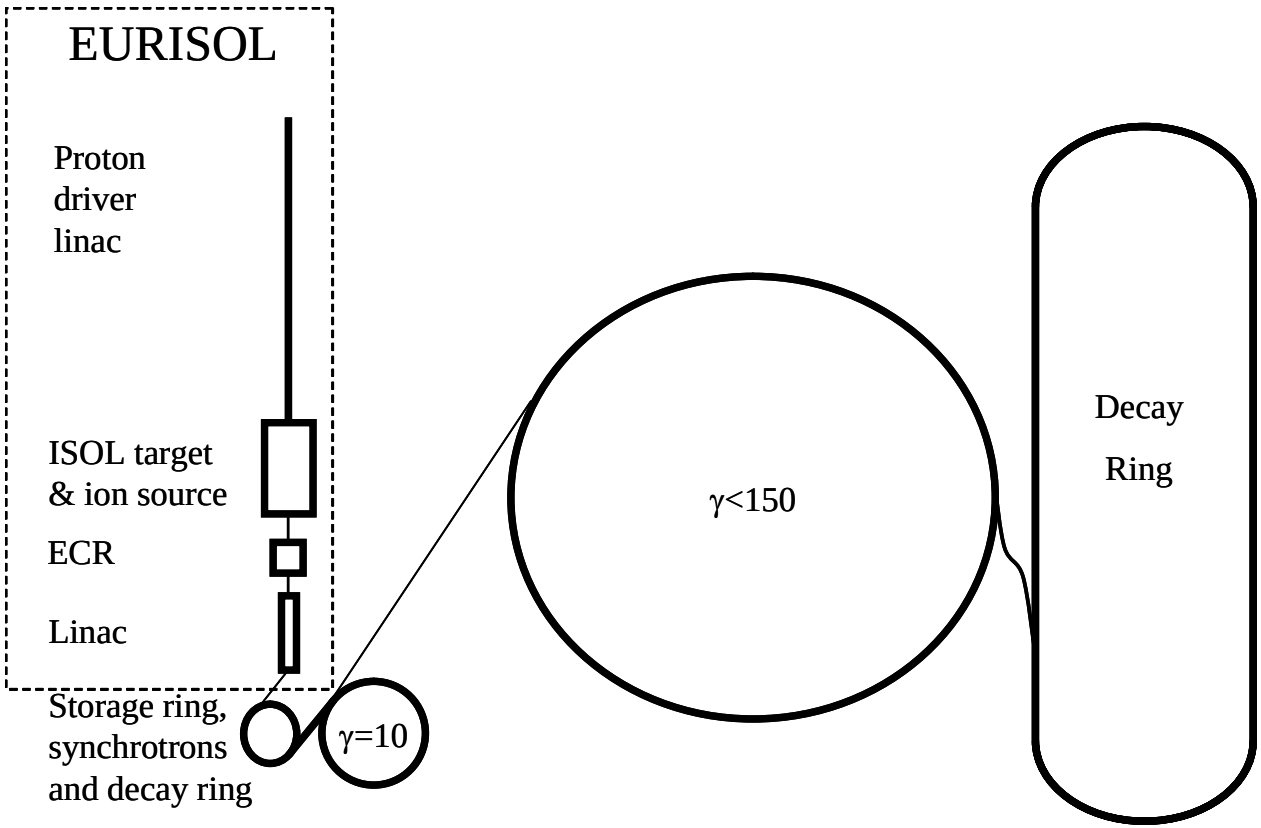
Calculations for EURISOL : Helge Ravn



^{6}He 5X10^{13} pps
^{18}Ne 5X10^{12} pps

Fig. 5.2: The region of the chart of nuclides that illustrates the interesting doubly-magic nuclei far from stability and a comparison of their projected rates (as in figure 5.1) at EURISOL and the future GSI facility ('SIS 200').

The beta-beam concept



The EURISOL Road Map

- Vigorous scientific exploitation of current ISOL facilities : EXCYT, Louvain, REX/ISOLDE, SPIRAL
- Construction of intermediate generation facilities : MAFF, REX upgrade, SPES, SPIRAL2
- Design and prototyping of the most specific and challenging parts of EURISOL in the framework of EURISOL_DS.

The EURISOL_DS proposal in the 6th framework

- Detailed engineering oriented studies and technical prototyping work
- 21 participants from 14 countries
- 21 contributors from Europe, Asia and North America
- Total Cost : 33 M€
- Requested contribution from EU : 9.16 M€

11 Tasks

- **Physics, beams and safety**
  - Physics and instrumentation (Liverpool)
  - Beam intensity calculations (GSI)
  - Safety and radioprotection (Saclay)
- **Accelerators :** ***Synergies with HIPPI (CARE)***
  - Proton accelerator design (INFN Legnaro)
  - Heavy ion accelerator design (GANIL)
  - SC cavity development (IPN Orsay): SC cavity prototypes and multipurpose cryomodule
- **Targets and ion sources :** ***Synergies with spallation sources***
  - Multi-MW target station (CERN) : mercury converter
  - Direct target (CERN) : Several target-ion source prototypes
  - Fission target (INFN Legnaro) : UC_x target
- **BB :** ***Synergies with BENE***
  - Beam preparation (Jyväskylä) : 60 GHz ECR source
  - Beta-beam aspects (CERN)

Management Structure