

Cern, May 13 2009

SPL, a driver for EURISOL?

Yorick Blumenfeld*

Isolde-CERN

* On leave from IPN Orsay

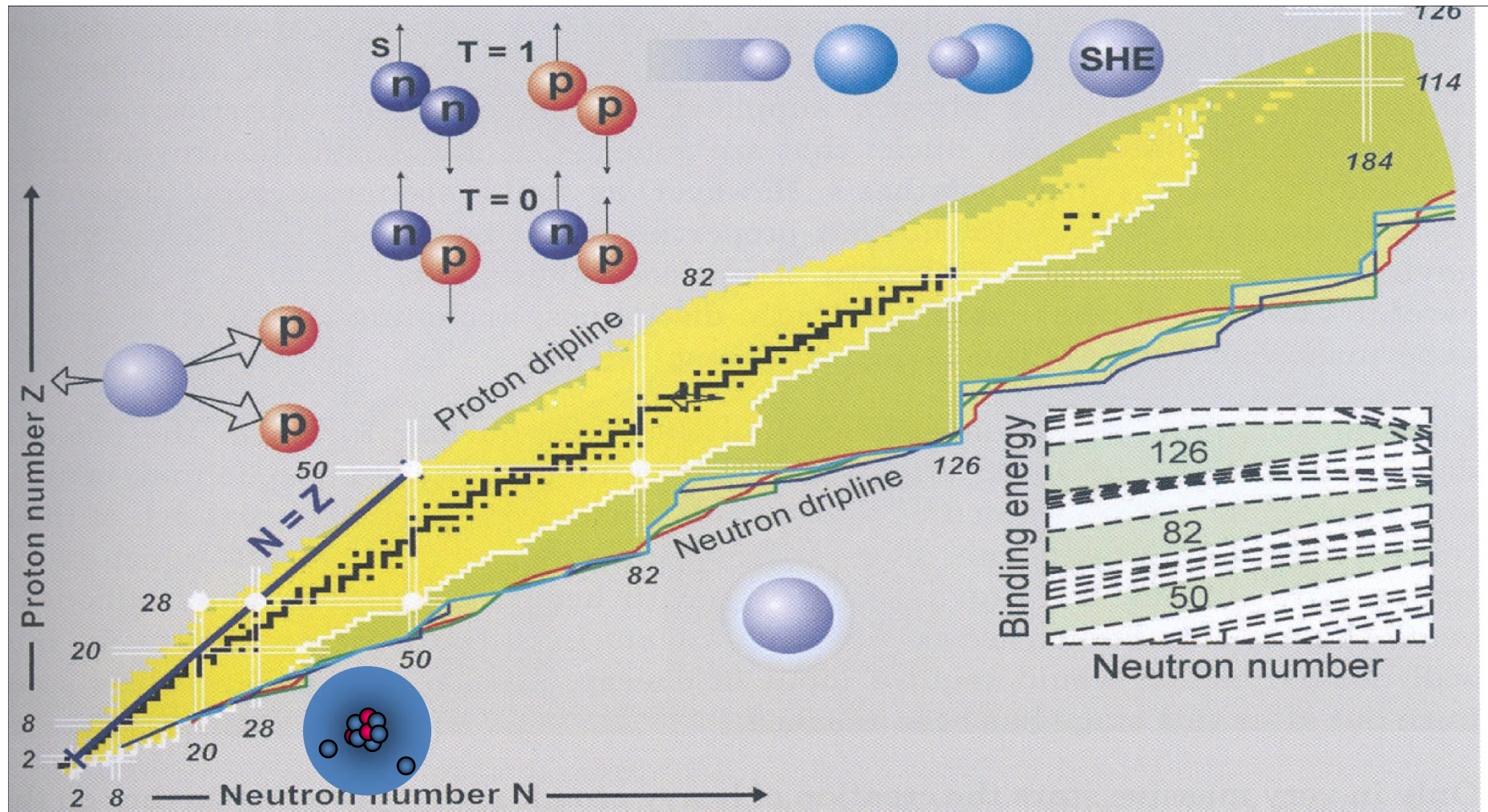
We acknowledge the financial support of the European Community under the FP6 "Research Infrastructure Action - Structuring the European Research Area" EURISOL DS Project Contract no. 515768 RIDS . The EC is not liable for any use that can be made of the information contained herein.

ISOLDE
CERN



EURISOL
Design Study

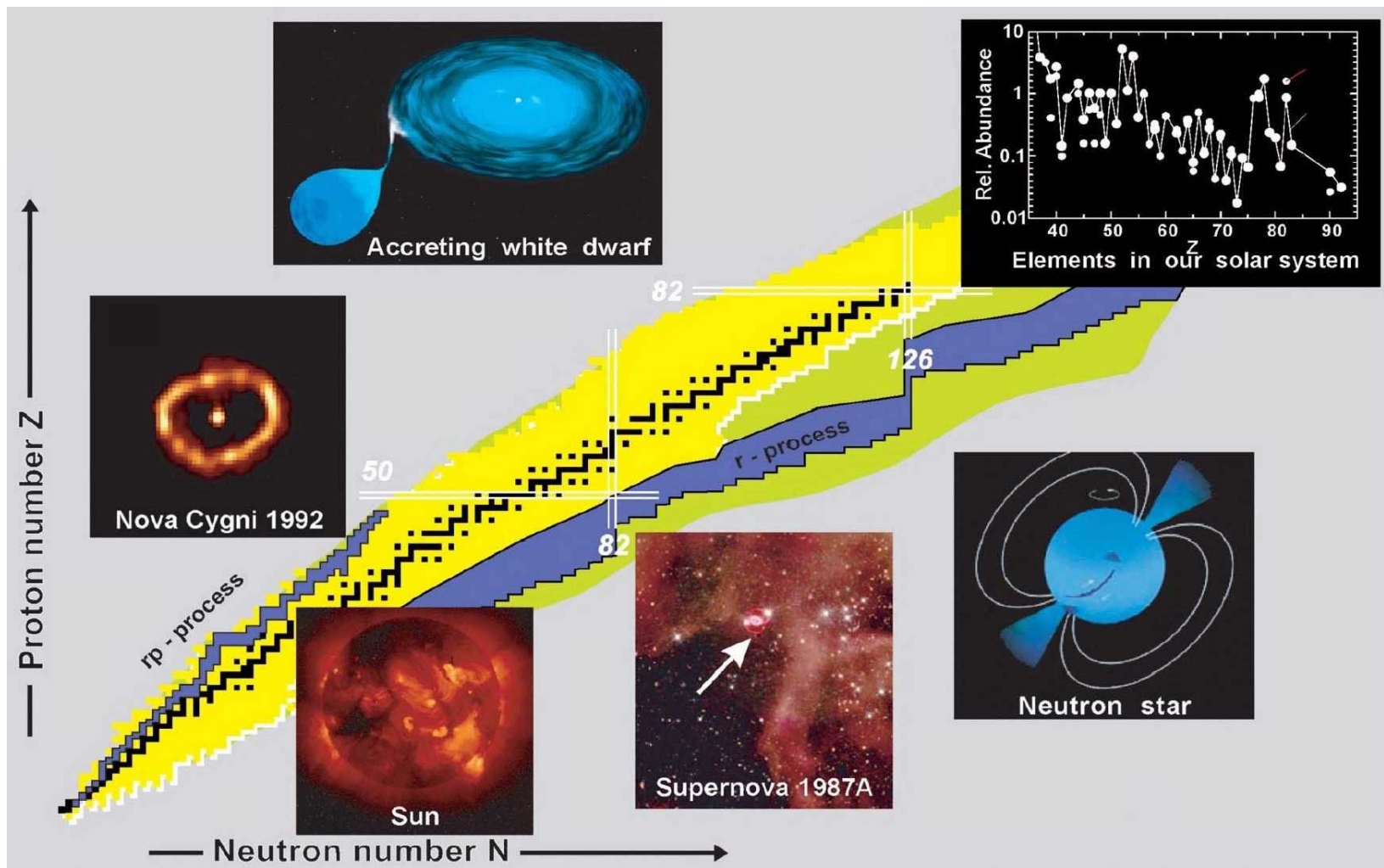
The Nuclear Chart and Challenges



r and rp processes in stellar events

From K.-L. Kratz

Kernchemie + VISTARS, Universität Mainz



EURISOL will provide Radioactive Ion Beams over the entire nuclear chart with a wide range of energies (keV/A to 150 MeV/A) and intensities between 10^3 to 10^6 times larger than present day facilities. It is to be the “ultimate” ISOL facility for Europe.

THE EUROPEAN PLAN

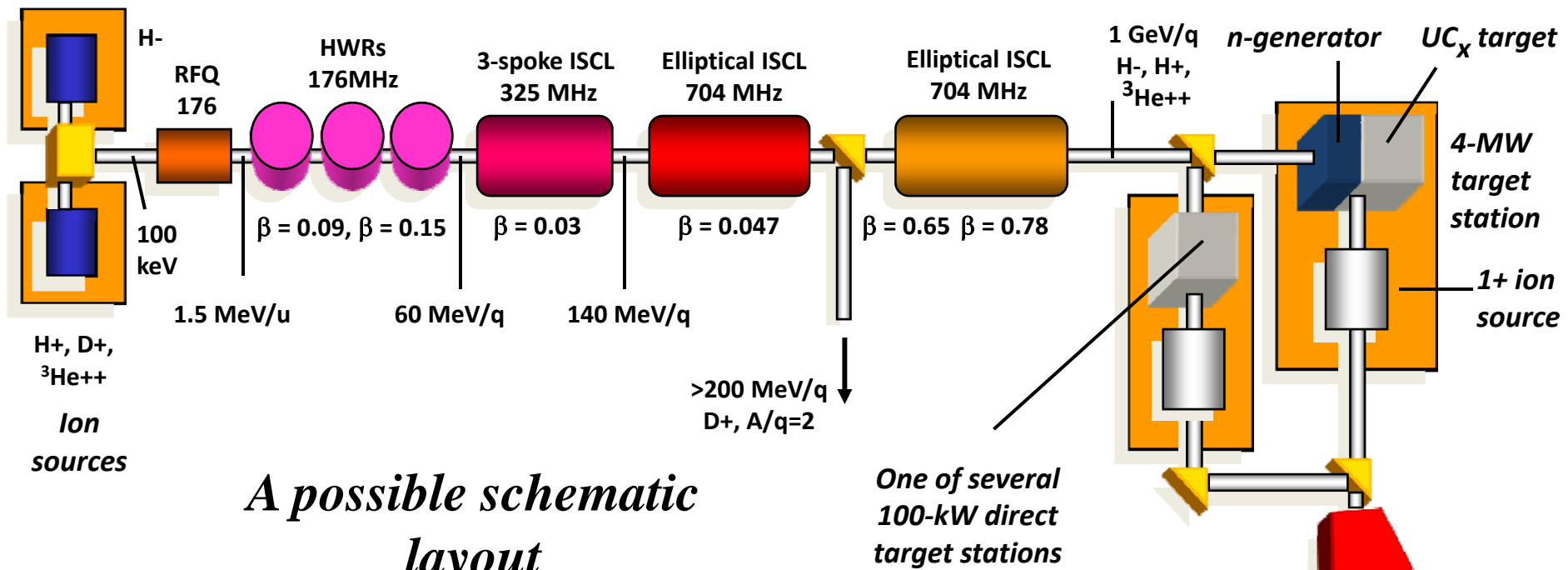
NuPECC recommends the construction of 2 'next generation' RIB infrastructures in Europe, i.e. one ISOL and one in-flight facility. The in-flight machine would arise from a major upgrade of the current GSI facility: FAIR, while EURISOL would constitute the new ISOL facility

The EURISOL Road Map

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

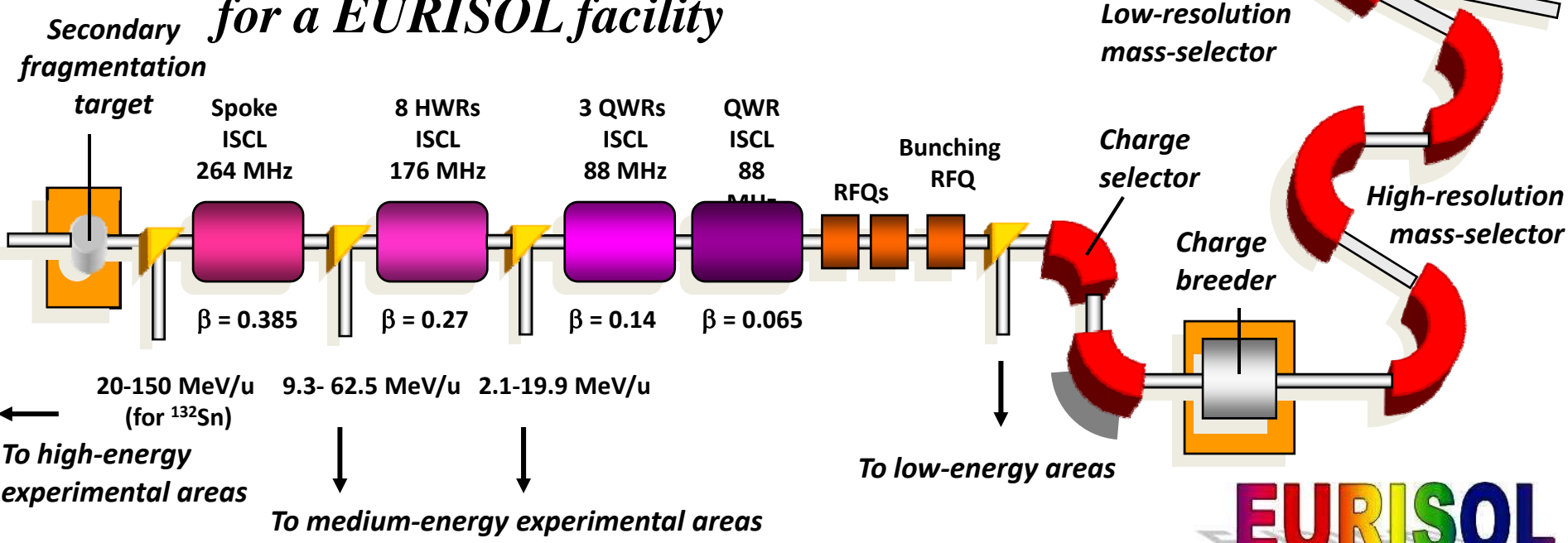
The EURISOL DS and the Participation of CERN

- 20 Participant Laboratories from 14 European countries; 21 Contributors from around the world.
- 4 ½ years; 2005-2009
- Total Budget 30 MEuros ; 9.1 ME from EC
- 12 tasks; 3 led by CERN
- CERN received 1.8 ME from EC; contributed 2.4 ME and 450 man-months.
- A stable design has been proposed, validated by international expert panels.
- Prototypes of many crucial parts have been constructed and tested.



A possible schematic layout

for a EURISOL facility



Could the SPL be the EURISOL Driver?

Minimum Cost Option : Still acceptable by HIE-ISOLDE Target Station with new target technology

Beam energy (GeV)	Max. pulse duration (ms)	Max. current during pulse (mA)	Cycling rate* (Hz)	Max. protons /pulse ($\times 10^{13}$)	Max. beam power (kW)
1	0.35	28	2.92 (7 out of 8 pulses)	6.1	29

Medium Cost Option with Higher Cycling Rate : Higher Power Klystron Modulators. This would be EURISOL with Direct Targets only (few 10s Meuros supplement)

Beam energy (GeV)	Max. pulse duration (ms)	Max. current during pulse (mA)	Cycling rate* (Hz)	Max. protons /pulse ($\times 10^{13}$)	Max. beam power (kW)
2	0.35	28	~ 10 (23 out of 24 pulses)	6.1	200

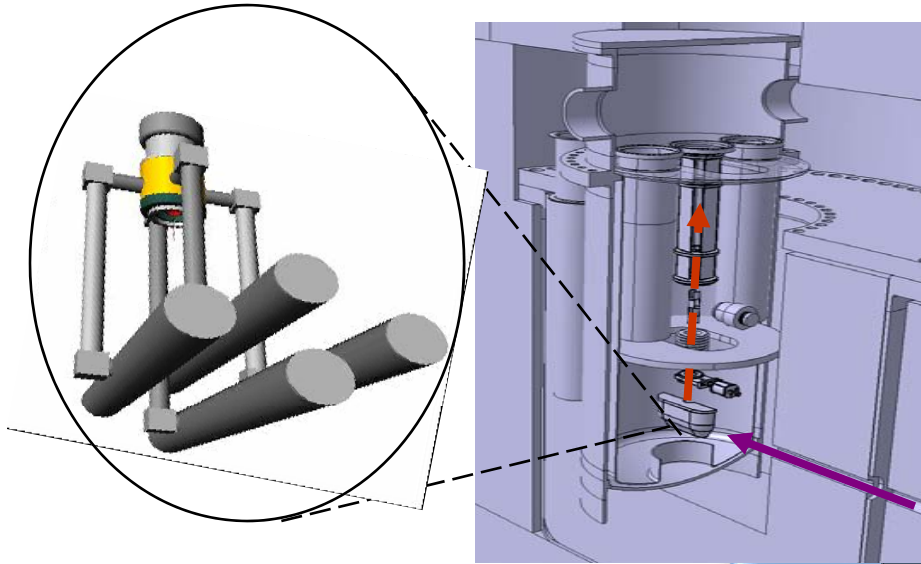
High Power SPL : Approaching the Full EURISOL with Hg Converter (100 ME supplement)

Beam energy (GeV)	Max. pulse duration (ms)	Max. current during pulse (mA)	Cycling rate* (Hz)	Max. protons /pulse ($\times 10^{13}$)	Max. beam power (kW)
2	0.9	20	~ 50	1.1	1800

Thanks to Roland Garoby

Warning: Pulsed Beam means Stress on Targets

Target Designs for EURISOL

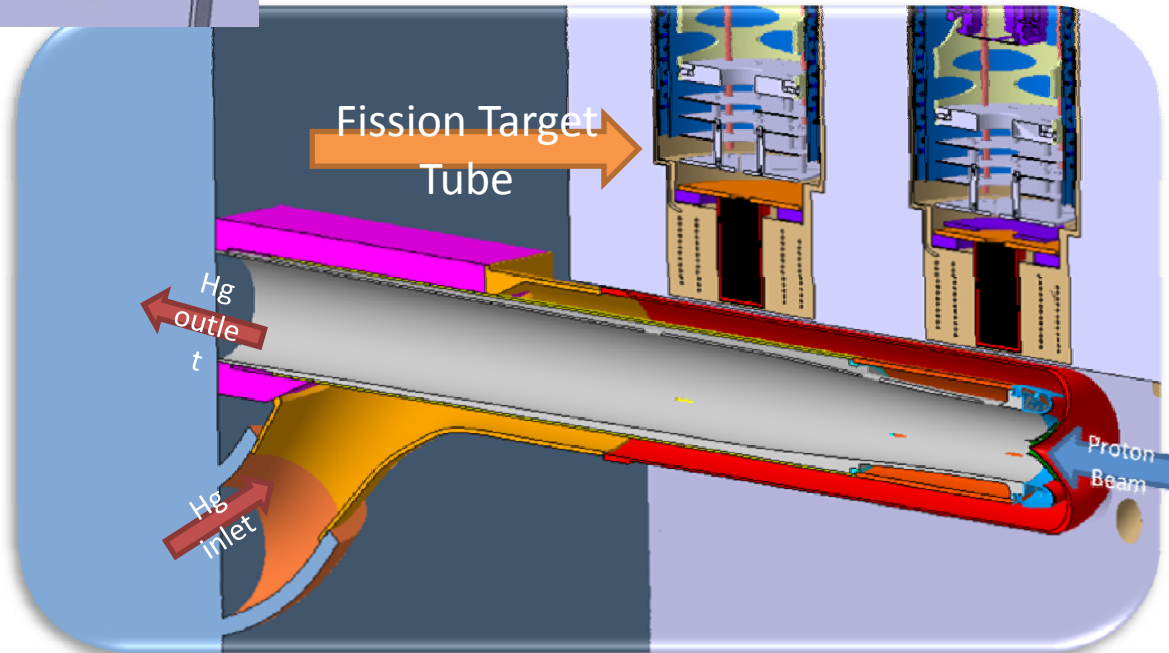


Direct Target : 100 kW

Thierry Stora

MMW Hg Target

Yacine Kadi



CERN as a site for EURISOL?



Site Investigation Panel Report

Giacomo Cuttone (INFN-LNS), Don Geesaman (Argonne), Alex C. Mueller (IN2P3), Steve Myers (CERN) and Alan Shotter (TRIUMF/ Edinburgh; chair).

The primary conclusion of this exercise is that Europe has several sites that are extremely well-suited for hosting EURISOL and that bring a great deal of pre-existing value to the table in terms of facilities, existing equipment, expertise and experience. CERN and GANIL appear to meet all the criteria put forward at present. Significant additions at LNL, and a clear commitment by the Rutherford Appleton Laboratory management would likely bring these candidate sites to a similar level.

