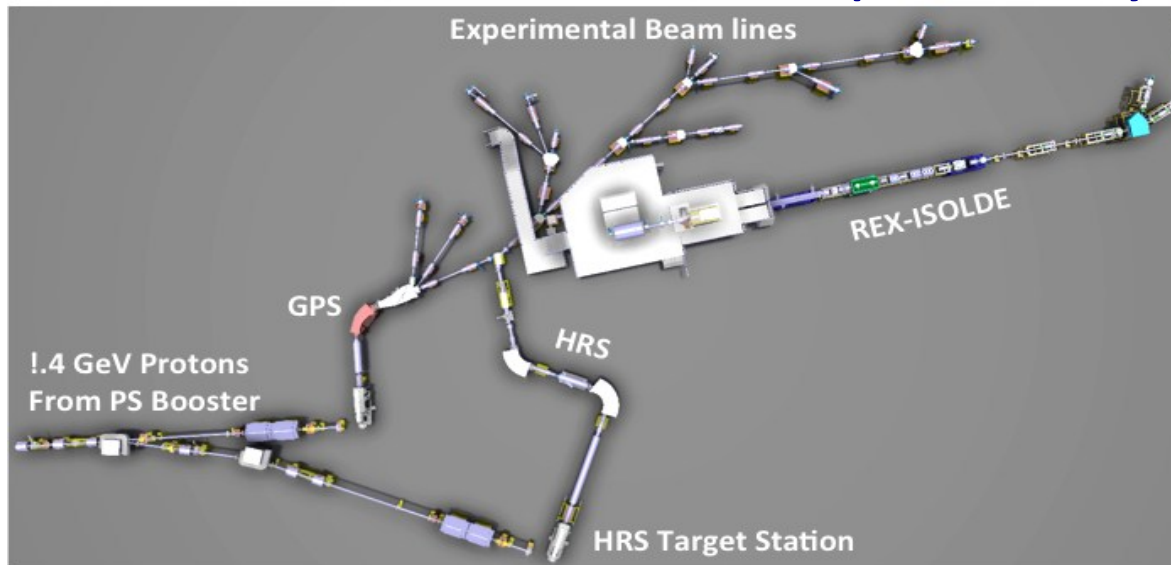


ISOLDE Facility : a few facts

- ISOLDE is the CERN radioactive beam facility (approved 50 y ago!)
- Provides low energy or post-accelerated beams
- Run by an **international collaboration since 1965**.
Presently 13 members (B, CERN, Dk, E, F, Ge, Gr, I, India, N, R, S, UK)
- **> 500 Users from 100 Institutions, 50 experiments / year**



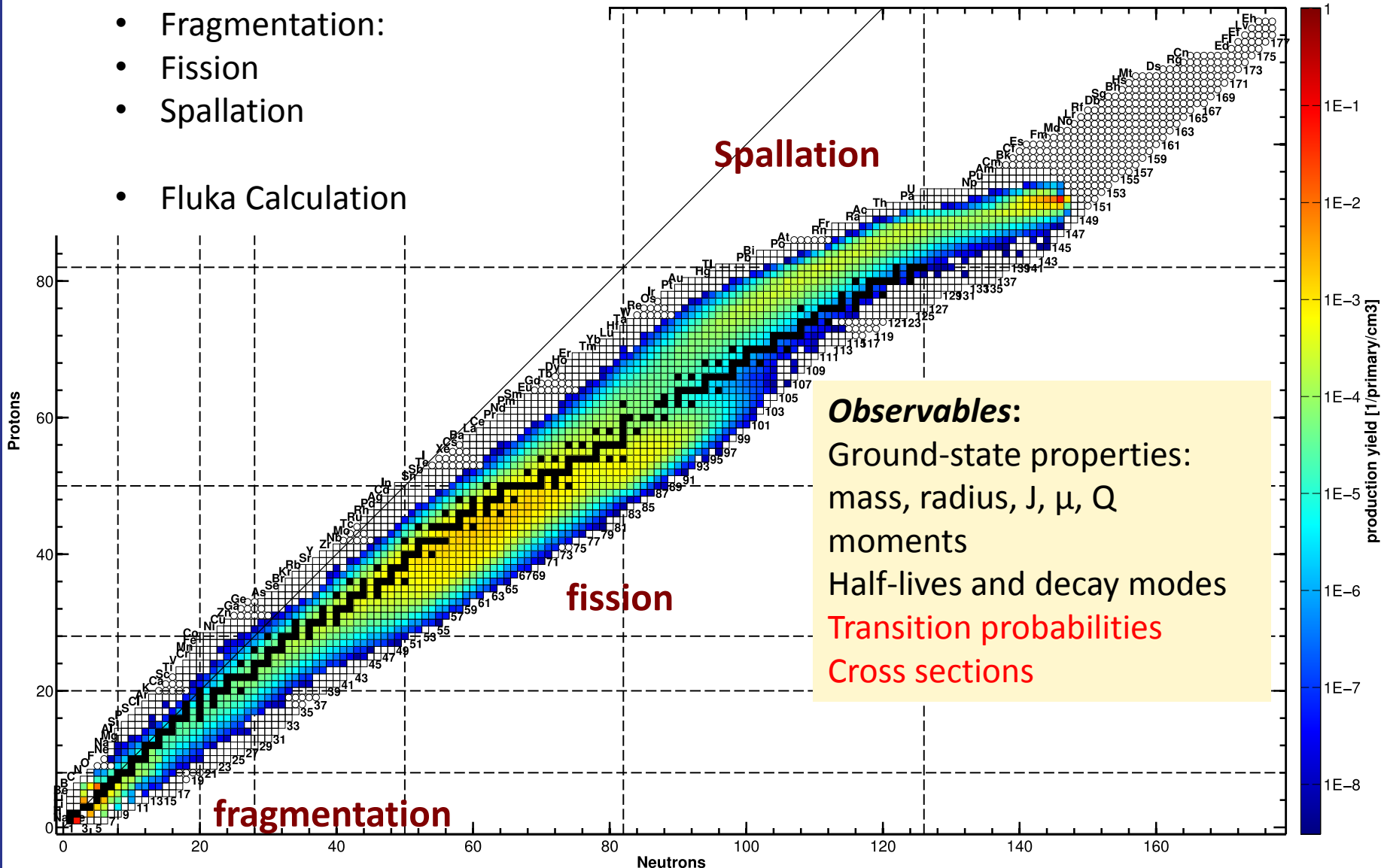
“CERN has agreed to approve the project HIE-ISOLDE, on account of its scientific potential as well as its several unique features for ISOL radioactive beam production.” *Approved by council 2009, started 2010*

Production of Radiative Beams @ ISOLDE

Primary Nuclear Reaction

- Fragmentation:
- Fission
- Spallation
- Fluka Calculation

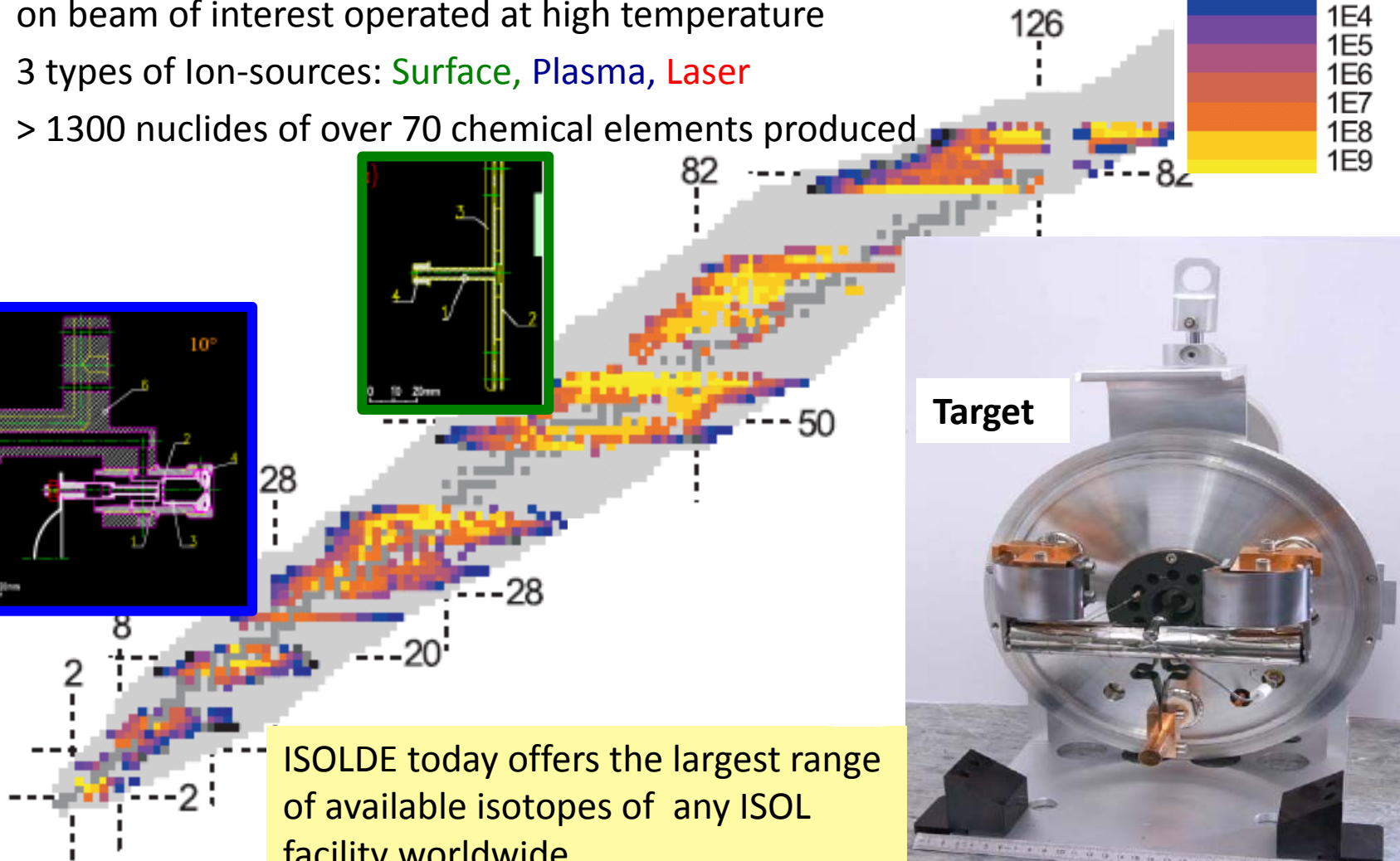
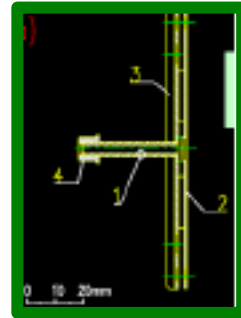
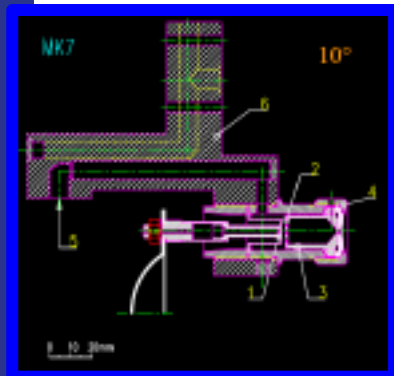
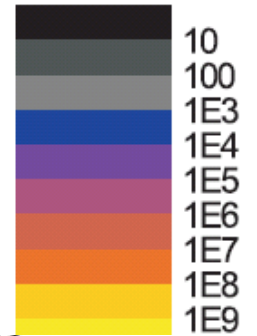
1.4 GeV P beam on UC-Target



Produced Nuclei: ISOLDE long Experience

- Over 20 target materials (carbides, oxides, solid metals, molten metals and molten salts) and ionizers, depending on beam of interest operated at high temperature
- 3 types of Ion-sources: **Surface**, **Plasma**, **Laser**
- > 1300 nuclides of over 70 chemical elements produced

yield (at/ μ C)



ISOLDE today offers the largest range of available isotopes of any ISOL facility worldwide.

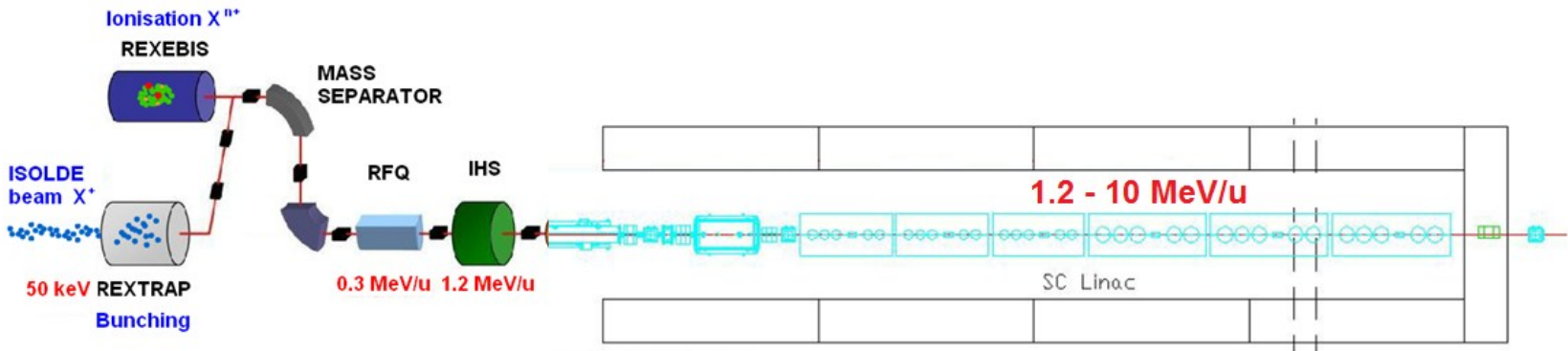


HIE-ISOLDE Project

✓ ENERGY:

Energy upgrade and lower energy capacity

- ❖ Wider range of radioactive beams
- ❖ Variable energy range from 1.2 up to 10 MeV/u



✓ INTENSITY:

ISOLDE proton driver beam intensity upgrade (LINAC4 +PSB)

Increase in Intensity expected of a factor of 3

Increase in proton energy to 2 GeV → Increase in production cross sections

- ❖ Target and frontend upgrade

✓ QUALITY:

Improvement of secondary beam quality: Reduction of phase space

- ❖ Purity, emittance: Selectivity
- ❖ Time structure: bunching

SC-LINAC Installed in 3-phases

- Approved Dec 2009
- Officially started Jan 2010
- Yacine Kadi project Leader
- Budget 43 M\$

REX ISOLDE

✓ HIE STAGE 1



Physics Autumn 2015
@ 4.3 MeV/u

Spring 2016 5.5 MeV/A

✓ HIE STAGE 2



2017
10 MeV/A

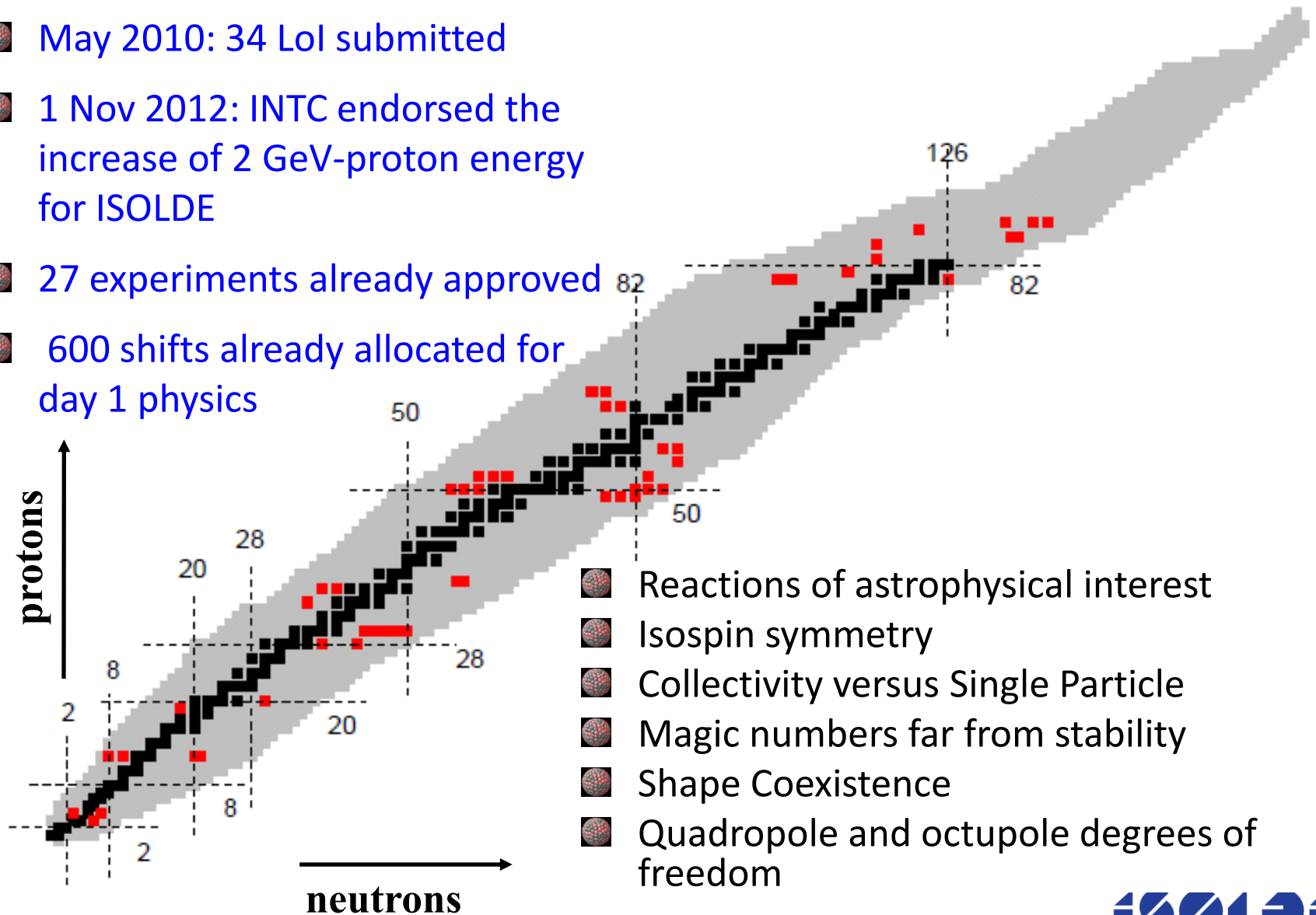
✓ HIE STAGE 3 WITH CHOPPER LINE 2018 (LS2)



In parallel Intensity Upgrade

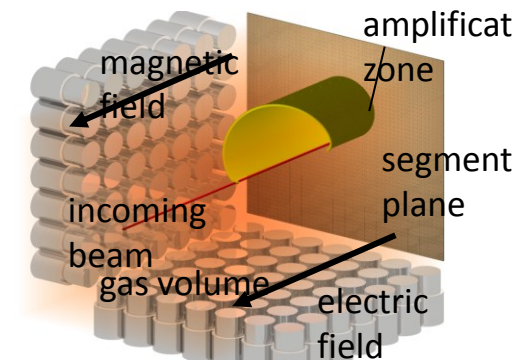
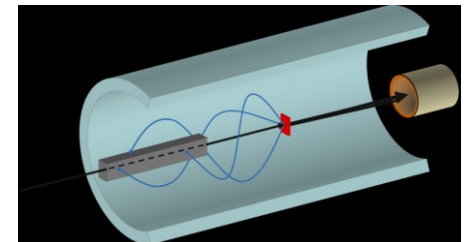
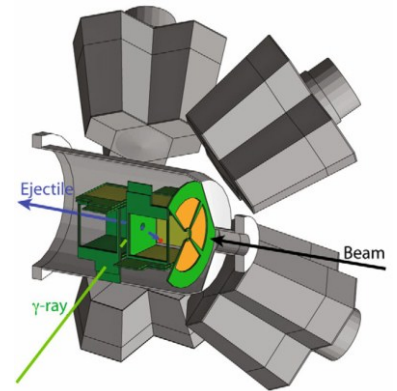
Physics @ HIE-ISOLDE (phase I)

- May 2010: 34 Lol submitted
- 1 Nov 2012: INTC endorsed the increase of 2 GeV-proton energy for ISOLDE
- 27 experiments already approved
- 600 shifts already allocated for day 1 physics



Instrumentation

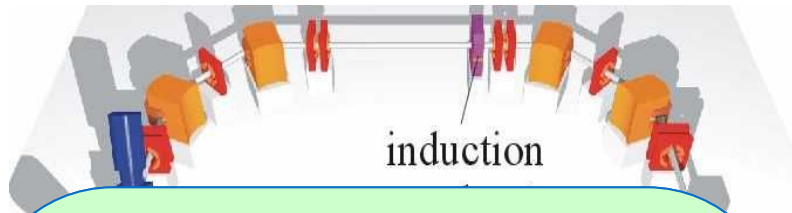
- Miniball + T-ReX (upgrade planned) :
COULEX + Transfer 22
- Multipurpose reaction chamber 2
- CORSET chamber for Fusion-fission reactions 1
- SPEDE: added to Miniball+T-REX 1
- Helios type device: transfer @ TSR 1
- MAYA/ACTAR: resonant scattering + transfer. 1
- For 2018: TSR storage ring,



Remember Riccardo Raabe's Talk !

TSR @ HIE-ISOLDE

K. Blaum, Y. Blumenfeld, P.A. Butler, M. Grieser, Yu.A. Litvinov,
R. Raabe, F. Wenzler and Ph.J. Woods (Eds.)
Storage Ring Facility at HIE-ISOLDE



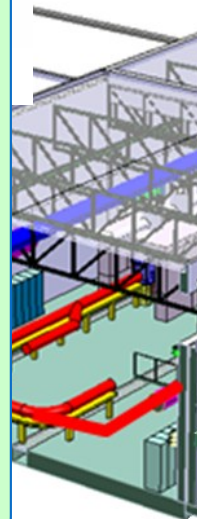
Advantages

to in-flight storage rings

- High intensity
- Cooler beams

With respect to “direct” beams

- Less background
(target, beam dump)
- Improved resolution
- CW beam



Physics programme

- Astrophysics
Capture, transfer reactions
 ${}^7\text{Be}$ half life
- Atomic physics
Effects on half lives
Di- electronic recombination
- Nuclear physics
Nuclear reactions
Isomeric states
Halo states
Laser spectroscopy
- Neutrino physics



So EURISOL-DF has to be considered



B. Jonson, Eurisol Lisbon
Meeting 15-19 October 2012

EURISOL-DF @ ISOLDE

- Aim: keep the spirit of EURISOL alive by join efforts between the existing and under construction ISOL facilities in Europe and “build” EURISOL-DF.
- With EURISOL-DF we will apply to EU to enter in the ESFRI-list
- Define what we would like to put in common to make a Distribution Facility and not a network
 - Share part of the PAC members.
 - What else....
- Steps taken:
 - 1. Preliminary discussion with DG-EU : Svetlomir Stavrev 17 oct 2014
 - ✓ Contact the Swiss representative to get their support.
 - ✓ Prepare a 1 page description of the project for swiss.
 - ✓ To be approved by Council.
 - Consult the CERN legal service, DG-LS: Eva Maria Groniger-Voss
 - Scientific Director: Sergio Bertolucci 6 Nov 2014
 - ✓ Most probably CERN cannot be member of ERIC

Main points for the EURISOL-DF

- Concentrate in the Intensity, purity and emittance of the radioactive beams .
Presently the design study is done.
 - Target + ION SOURCE
 - EBIS+REBUNCHER
 - HRS new design
 - ✓ Design of new beam dumps to face the increase in energy
 - Cost estimated in 10 MCHF
- Implementation of the TSR
 - Study done
 - Cost estimated 15 MCHF

