Review panel for LIEBE

Thierry Stora – EN-STI-RBS

Methodology followed

Baseline parameters

FLUKA & ANSYS: thermal conductivity, emissivity, thermal conductance

HEAT: Deposition, transfer

Nuclear cross sections: SigmasWin2000, ABRABLA and FLUKA

ISOTOPE PRODUCTION

RIBO, RaBIT and ion implantation, online tests, target material aging

ISOTOPE and RELEASE: Diffusion, effusion

CPO VORPAL simulation codes Online tests, emittance meter

ION SOURCE: Efficiency, emittance, space charge

On-paper Target Unit Design

Tests of specific components

Validation

Final prototype test

Final Target Unit Design Target station specifications
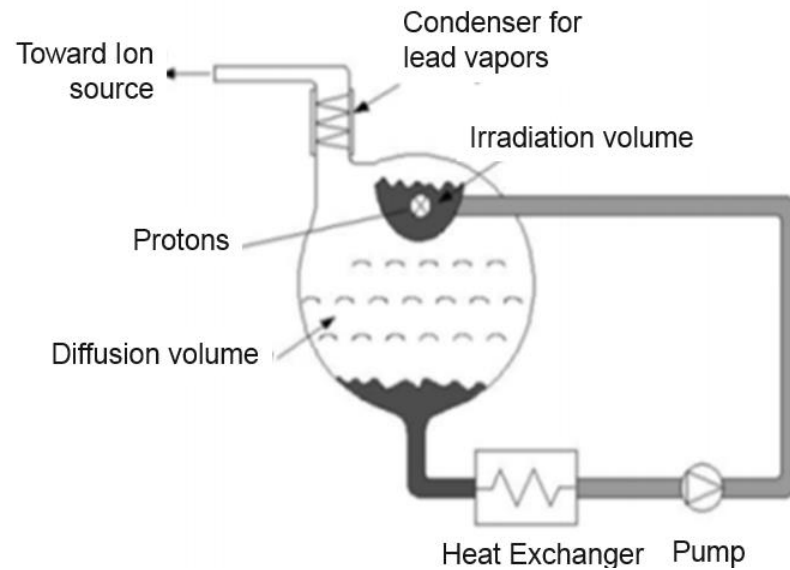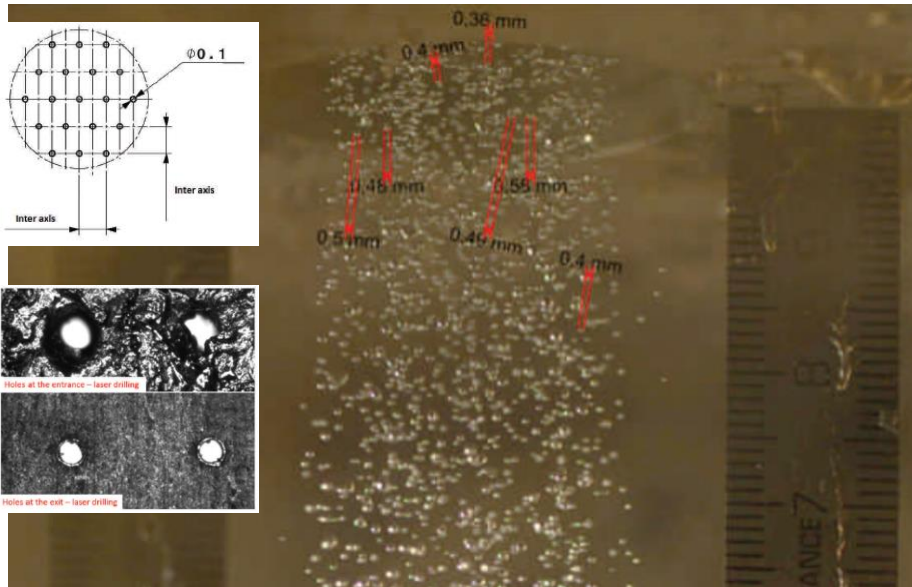
We are there

From EURISOL-DS

Initial concept

Conceptual design + prelimin. tests, E. Noah et all, EURISOL-DS (2005-2009)

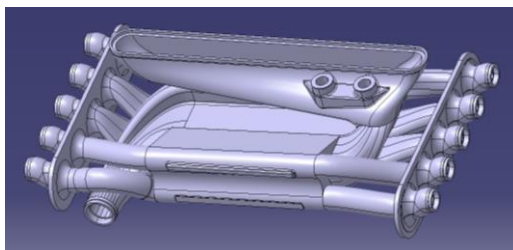# A few highlights

Critical Weber number for small droplet formation from LBE → possibly solves the main Liquid target drawback of slow release

Test and beam at the offline separator

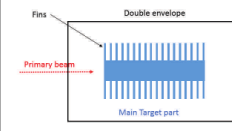Double enclosure, etc
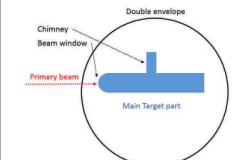
3D printed steel Heat Exchanger
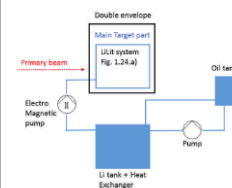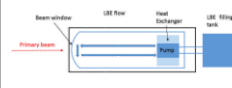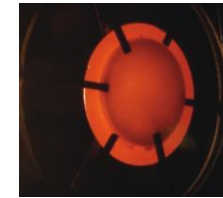
Larger framework of high power targets:
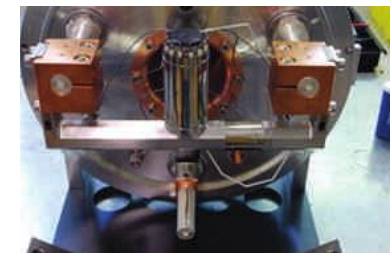# ISOL specificity : release of isotopes, "high T"

Melanie Delonca's PhD
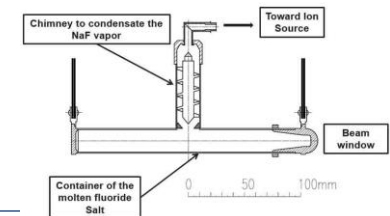
1st high power oxide direct ISOL Target @ TRIUMF

| Target name	Facility	Beam characteristics	Cooling system	Isotope release	Innovation	Safety measures	Schematic
ISAC Targets [21]	Triumf	proton beam - up to 25 kW constant power - continuous beam	Radiation from fins	Separated disks Material choice	Use of fins	Double enclosure	
Liquid Lead/Salt Targets [20]	Isolde	Proton beam - 3 kW average power - $11.7.10^6$ kW peak power - 0.8 Hz frequency	Radiation	Material choice (liquid) Splashing from shock waves induces droplets	Beam windows developed / chimney / liquid material	Double enclosure	
LiLit Target [22]	SARAF	proton beam - 2.3 kW average power - 20 kW peak power - 1 Hz frequency	Heat Exchanger	-	Heat Exchanger / Pump for liquid circulation / Li (metallic) window-less	Double enclosure	
MEGAPIE Target [11]	PSI	neutron beam - up to 66.10^3 kW constant power - continuous beam	Heat Exchanger	-	Heat Exchanger / Pump for liquid circulation	Double enclosure	

And also some hard learning cases
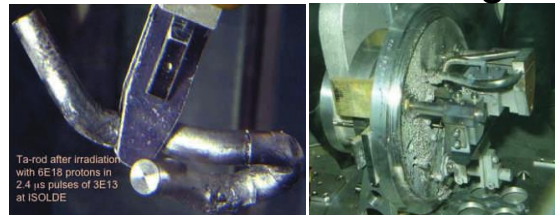
Ta-rod after irradiation with 6E18 protons in 2.4 µs pulses of 3E13 at ISOLDE

1st salt target at ISOLDE-PSB

(a) Molten Fluoride Salt target [47]

Special thanks to :

- CERN/external review panel
- Project partners
- Speakers

Looking forward to findings from the panel today