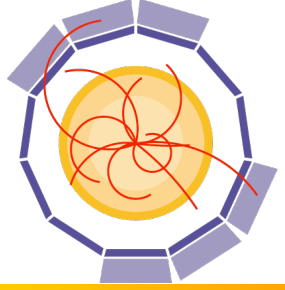

AIDA 2020

Transnational Access to Ljubljana JSI TRIGA Reactor (WP11.2)

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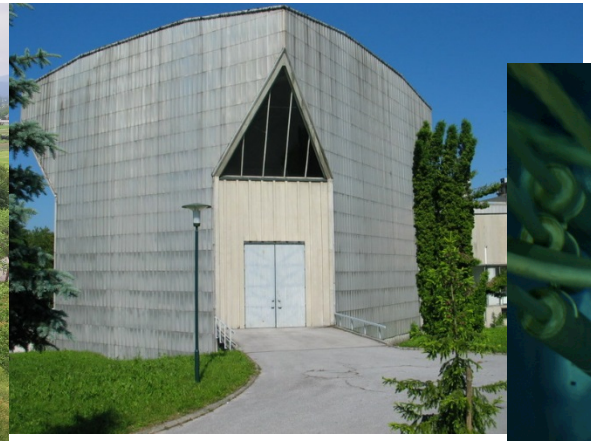
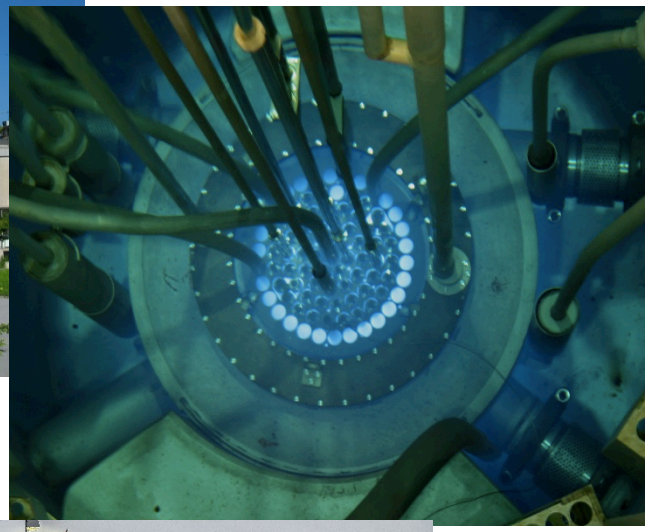
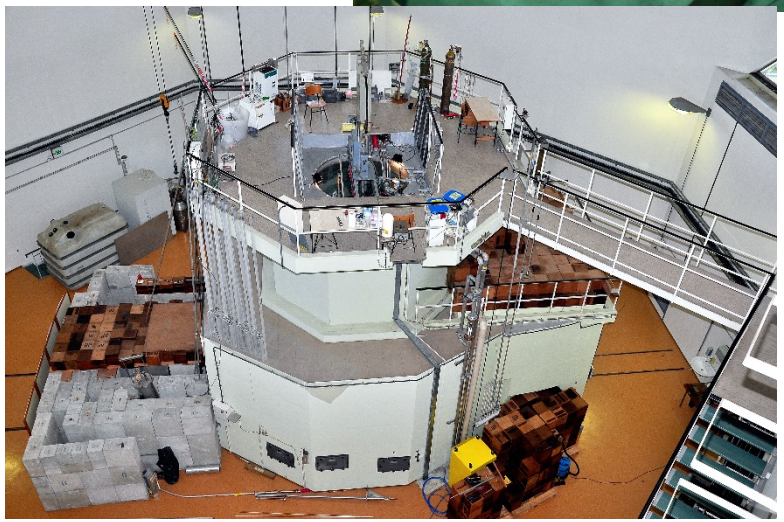
AIDA2020 Kick-Off Meeting, CERN, June 4, 2015

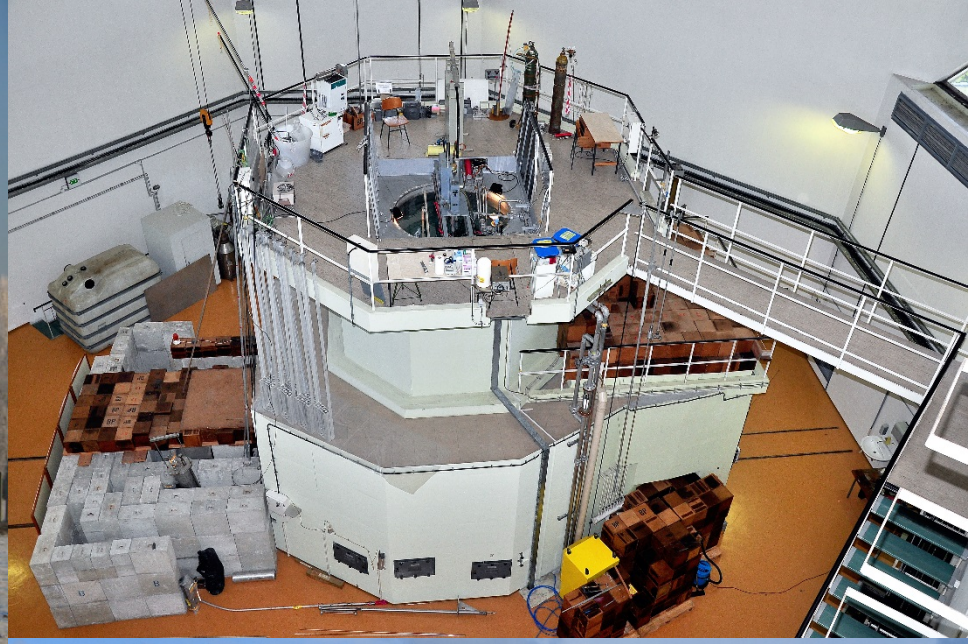
TRIGA Mark II Reactor Ljubljana

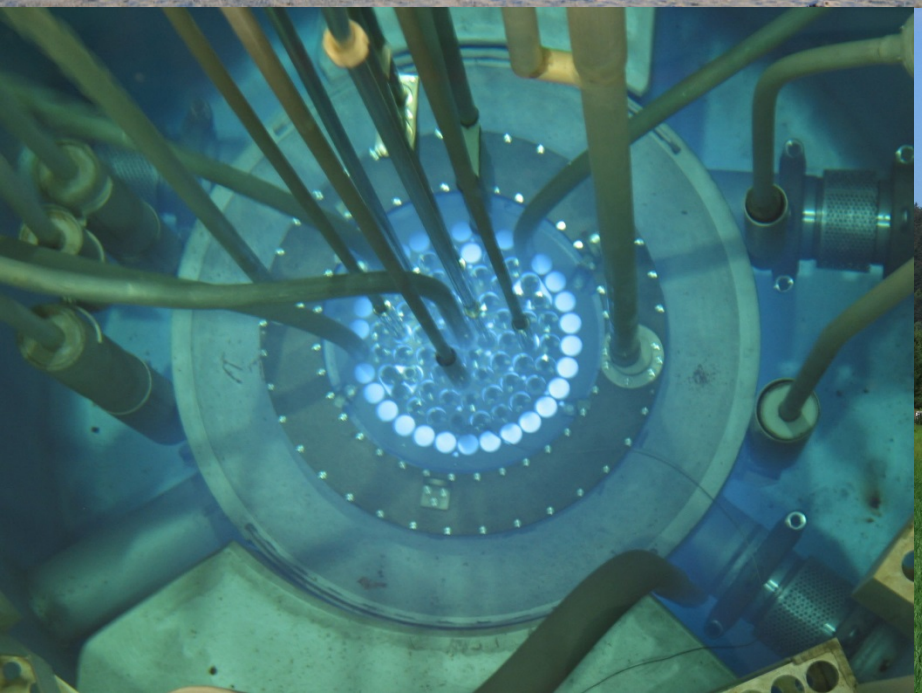


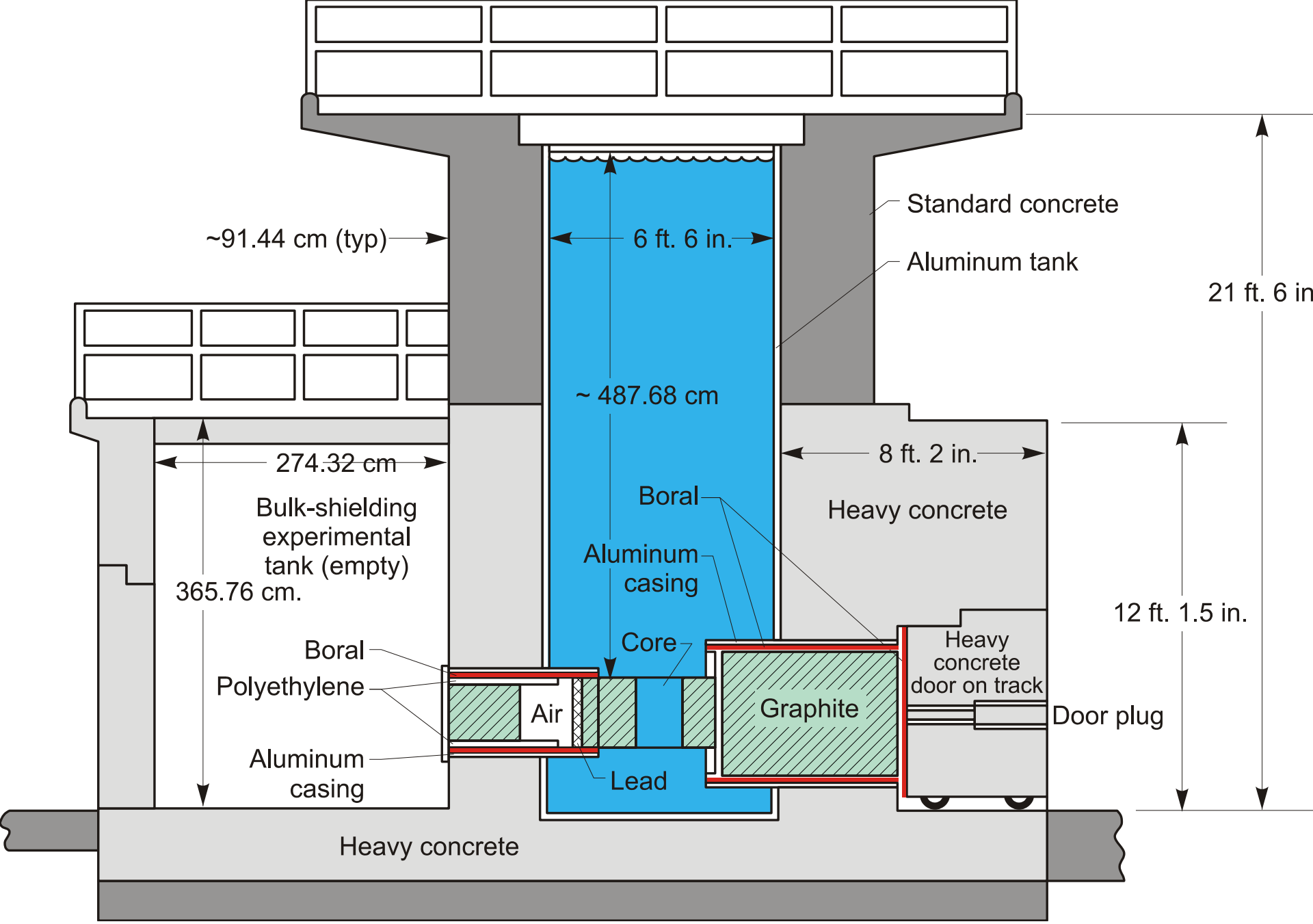


- 1st criticality:
  - 31st May, 1966
- P_{max}
  - 250 kW (steady state)
  - 1 GW (pulse)
- Fuel
  - UZrH (12 wt. % U)
  - E= 20 %





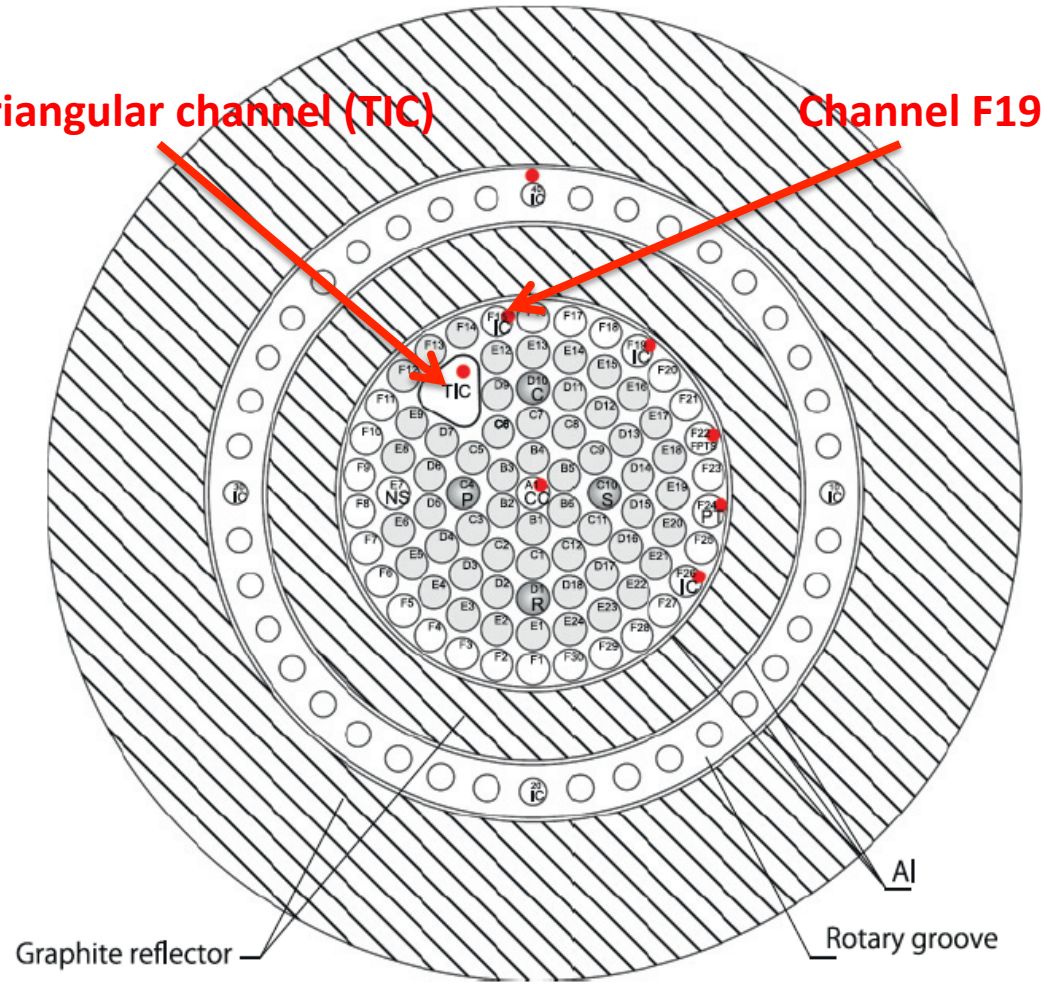



~91.44 cm (typ)
6 ft. 6 in.
Standard concrete
Aluminum tank
21 ft. 6 in
~ 487.68 cm
274.32 cm
Bulk-shielding
experimental
tank (empty)
365.76 cm.
8 ft. 2 in.
Heavy concrete
Boral
Aluminum
casing
Core
12 ft. 1.5 in.
Boral
Polyethylene
Air
Graphite
Heavy
concrete
door on track
Door plug
Aluminum
casing
Lead
Heavy concrete

Irradiation Benchmarks

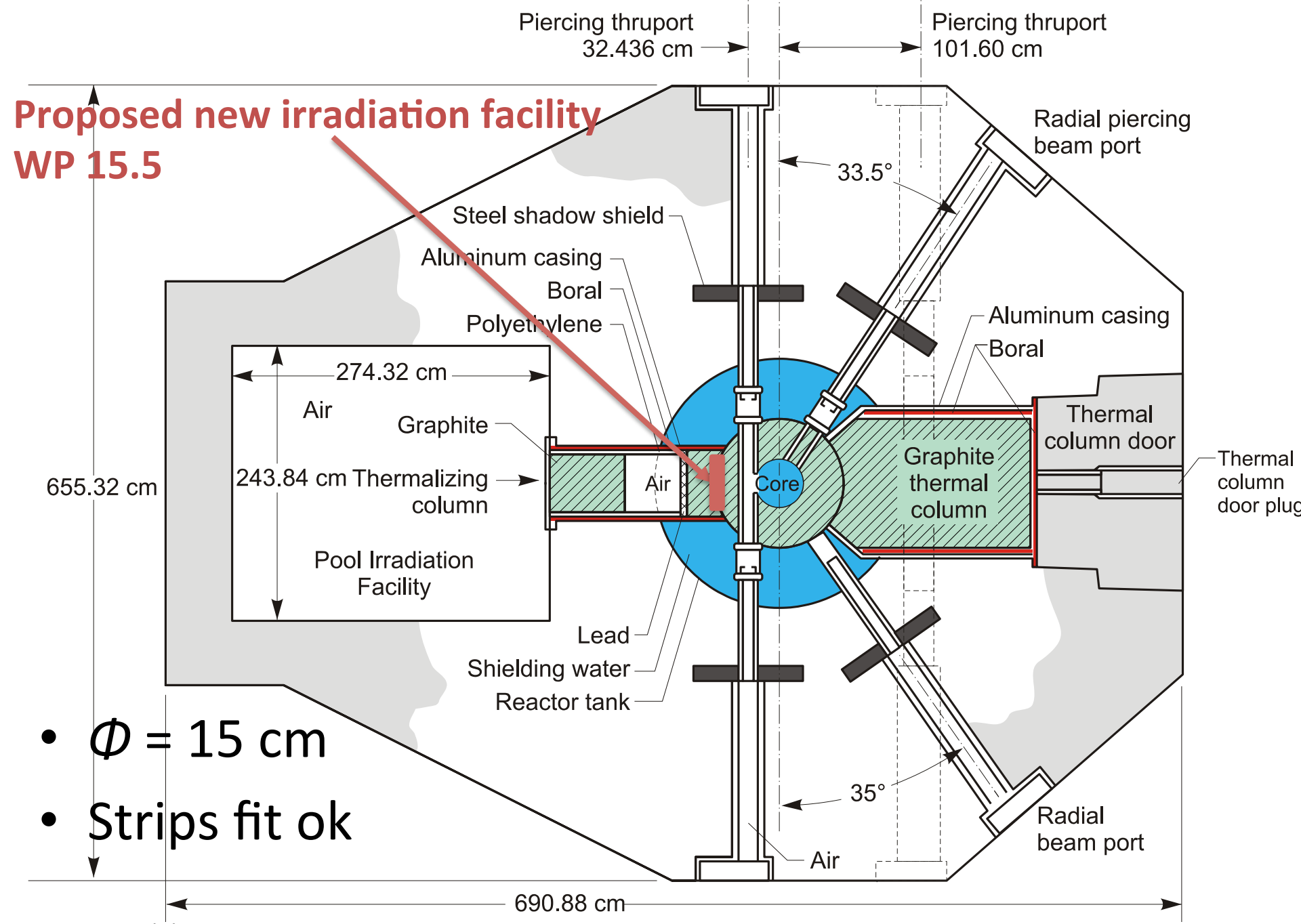
- 3 benchmark irradiations defined
  - Strip module (1e15 n_{eq}/cm^2, 10cm x 10cm)
  - Pixel module (1e16 n_{eq}/cm^2, 5cm x 5cm)
  - FWD module (1e17 n_{eq}/cm^2, 2cm x 2cm)

Irradiations in Reactor Core



- Ok for FWD and Pix
- Strips too big to fit

Fuel elements 20 % ^{235}U
Control rods
NS Neutron source
IC Irradiation channels
FPTS Fast pneumatic transfer system
PT Pneumatic transport tube channel
CC Central irradiation channel
TIC Triangular irradiation channel



- Φ = 15 cm
- Strips fit ok

Irradiation Channel Characteristics

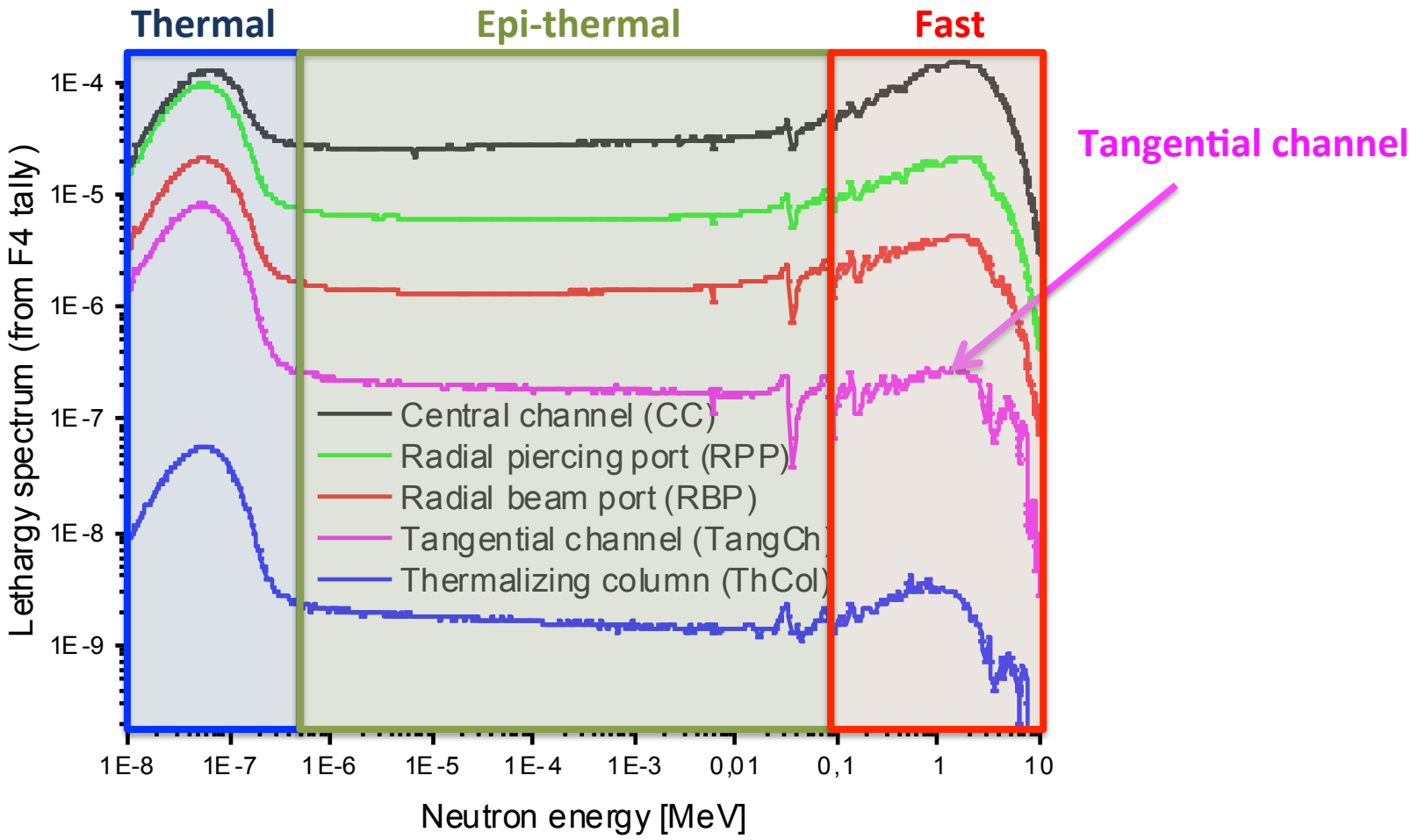
- Neutron flux characterisation:
  - L. Snoj et al., Appl. Rad. Isot. 70 (2012) 483–488

Absolute neutron flux (thermal: < 0.625 eV, epithermal: 0.625 eV–0.1 MeV, fast: > 0.1 MeV, and total) in TRIGA (core 189) at full power (250 kW).

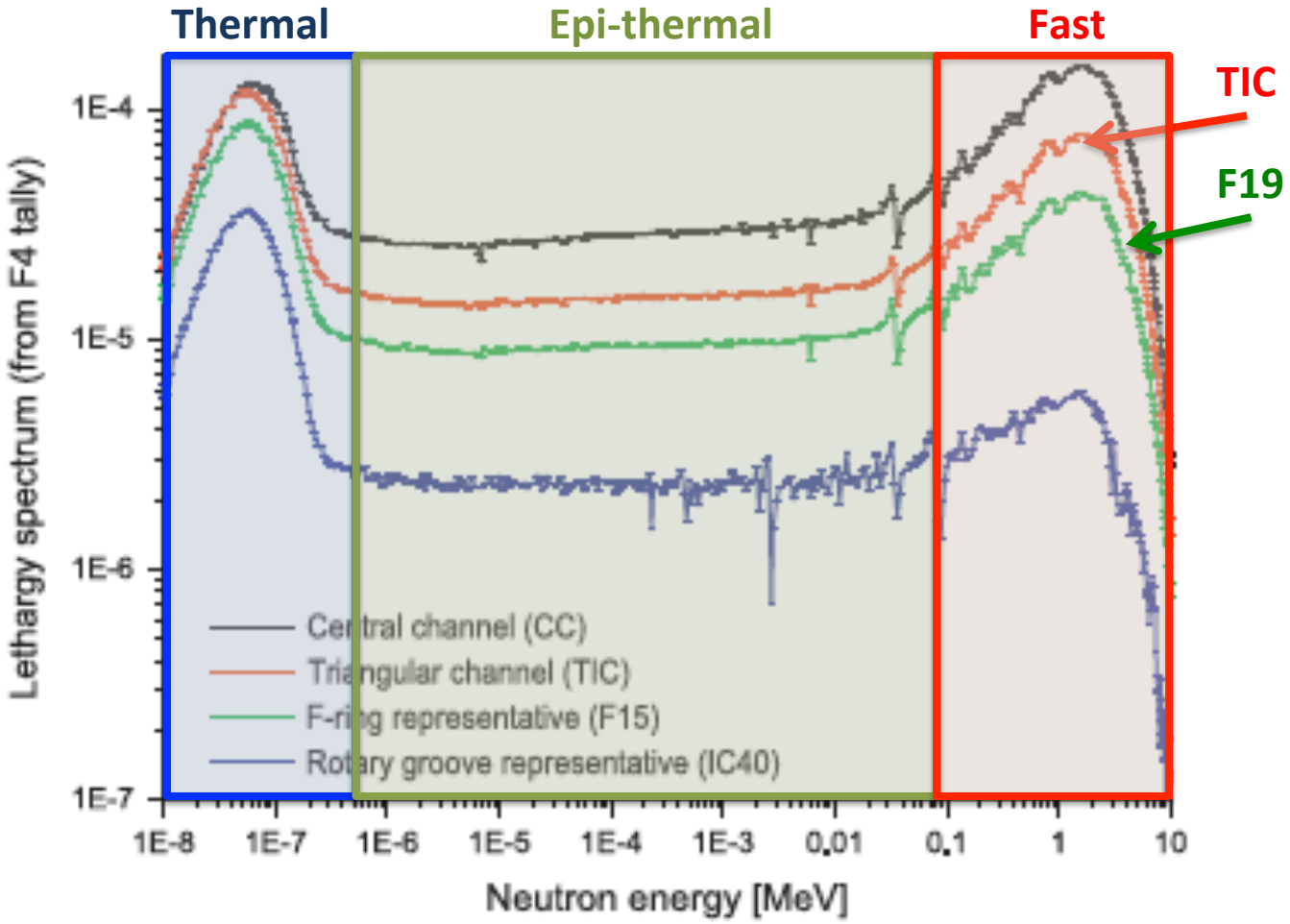
Irradiation channel	ϕ_{th} (cm^{-2} s^{-1})	ϕ_{ep} (cm^{-2} s^{-1})	ϕ_f (cm^{-2} s^{-1})	ϕ_{tot} (cm^{-2} s^{-1})
TangCh	$7.539 \times 10^{11}(1 \pm 0.0002)$	$3.249 \times 10^{11}(1 \pm 0.0003)$	$2.260 \times 10^{11}(1 \pm 0.0004)$	$1.305 \times 10^{12}(1 \pm 0.0002)$
F19	$3.664 \times 10^{12}(1 \pm 0.0006)$	$1.857 \times 10^{12}(1 \pm 0.0010)$	$1.805 \times 10^{12}(1 \pm 0.0010)$	$7.325 \times 10^{12}(1 \pm 0.0007)$
TIC	$4.456 \times 10^{12}(1 \pm 0.0007)$	$3.451 \times 10^{12}(1 \pm 0.0009)$	$3.845 \times 10^{12}(1 \pm 0.0008)$	$1.175 \times 10^{13}(1 \pm 0.0005)$

- Well suited to serve the 3 benchmarks on reasonable time-scales (1e17 in ~8h = 1 day)
- Caveat: thermal part -> activation !

Neutron Spectra Tangential



Neutron Spectra Core



Access Modality

- Same as in AIDA
  - No user presence on-site envisaged
  - Sample preparation, irradiation, post-radiation treatment, shipment by local staff
  - Application after consulting the facility manager through AIDA Web Form
    - Sanity check of requests, filtering of excessive requirements
  - USP approval sought on positive assumption basis
    - USP shall check usage and balance on a regular basis
  - Access Units (500 for 4 y) cover irradiations, preparation and post-radiation treatment

Deliverable, Budget

- D11.3: Transnational Access to JSI :
  - *Access Database of Transnational Access provision. Min. quantity of access to be provided: 500 units. Estimated number of users: 150. Estimated number of days spent at the infrastructure: 0. Estimated number of projects: 50. (Task 11.2)*
  - Deliverable for M48
- Budget: 196.6 k€ EC contribution, additional cost to 256 k€ total covered by internal funds
- Major budget drivers:
  - 125 k€ Access Cost
  - 78.4 k€ Personnel Cost