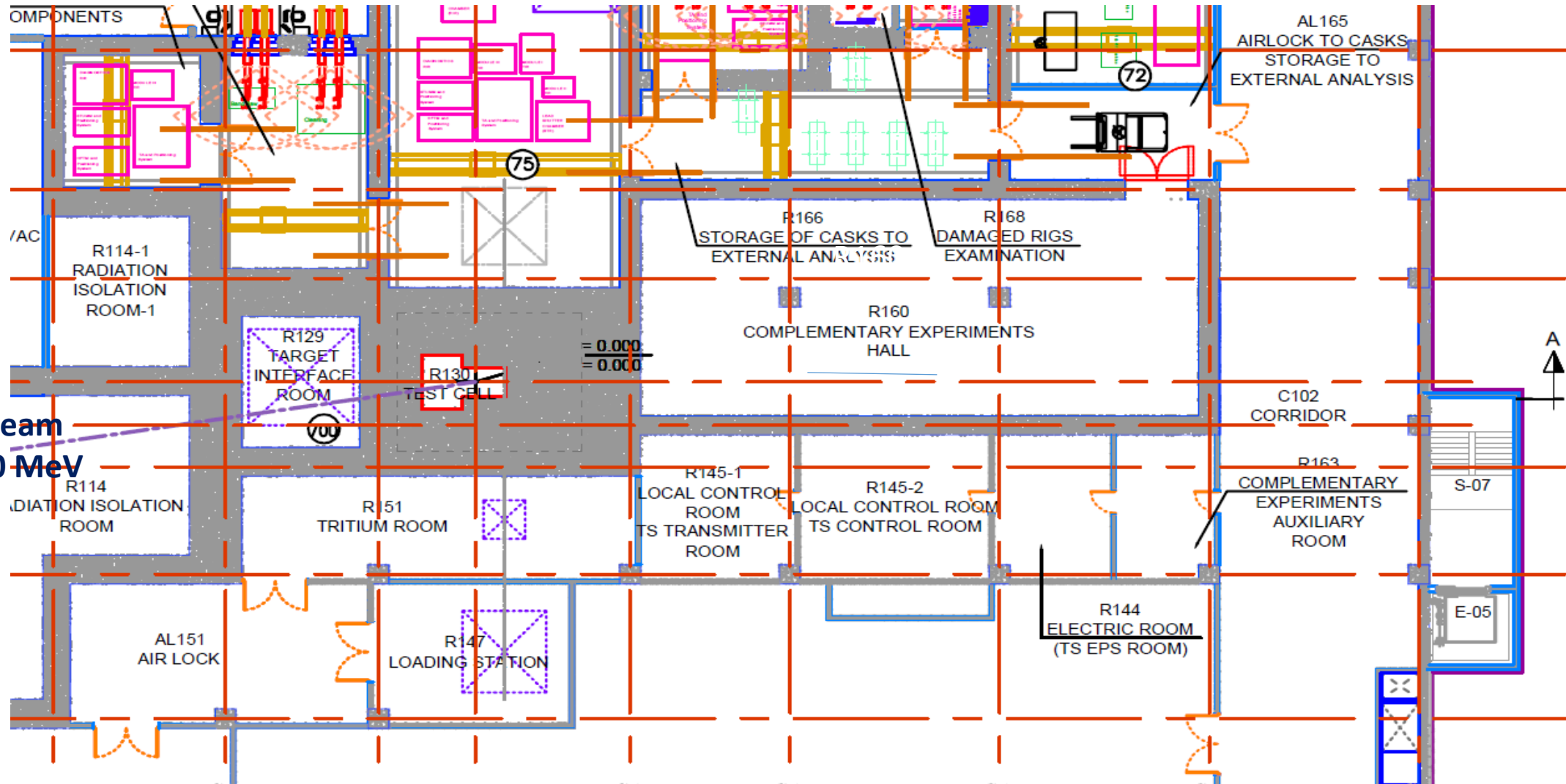


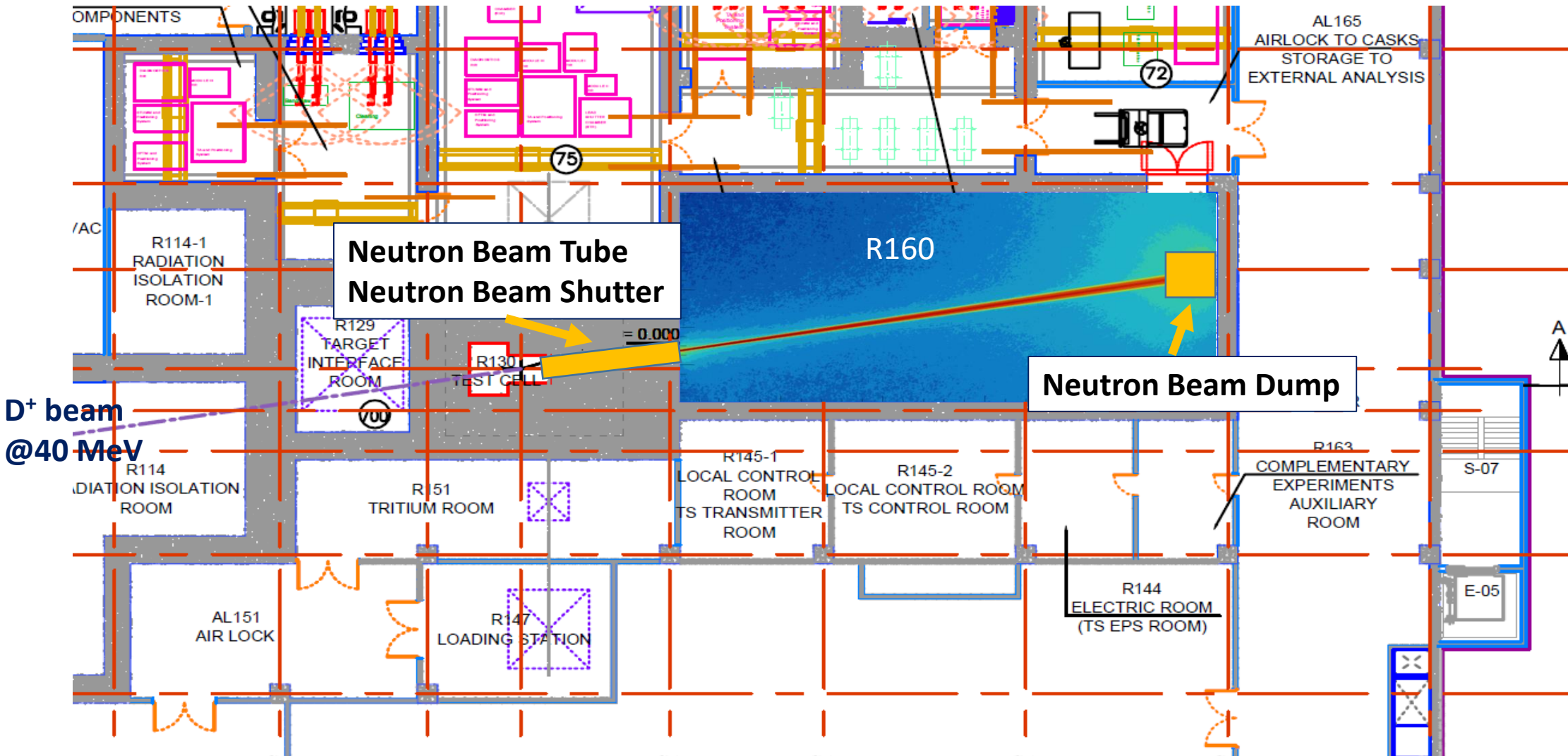
Complementary experiments – collimated neutron beam facility

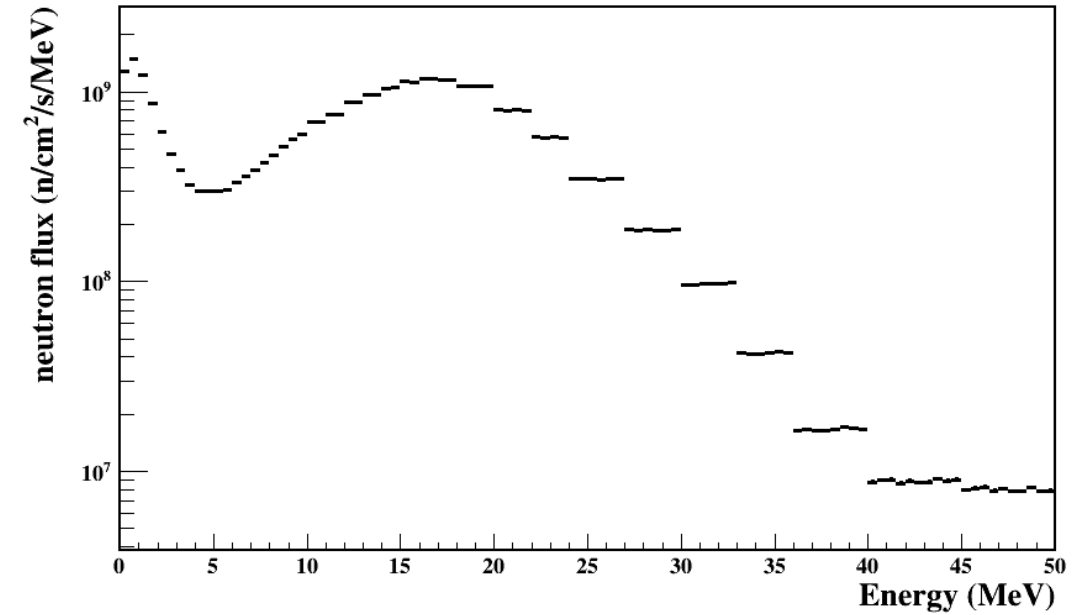
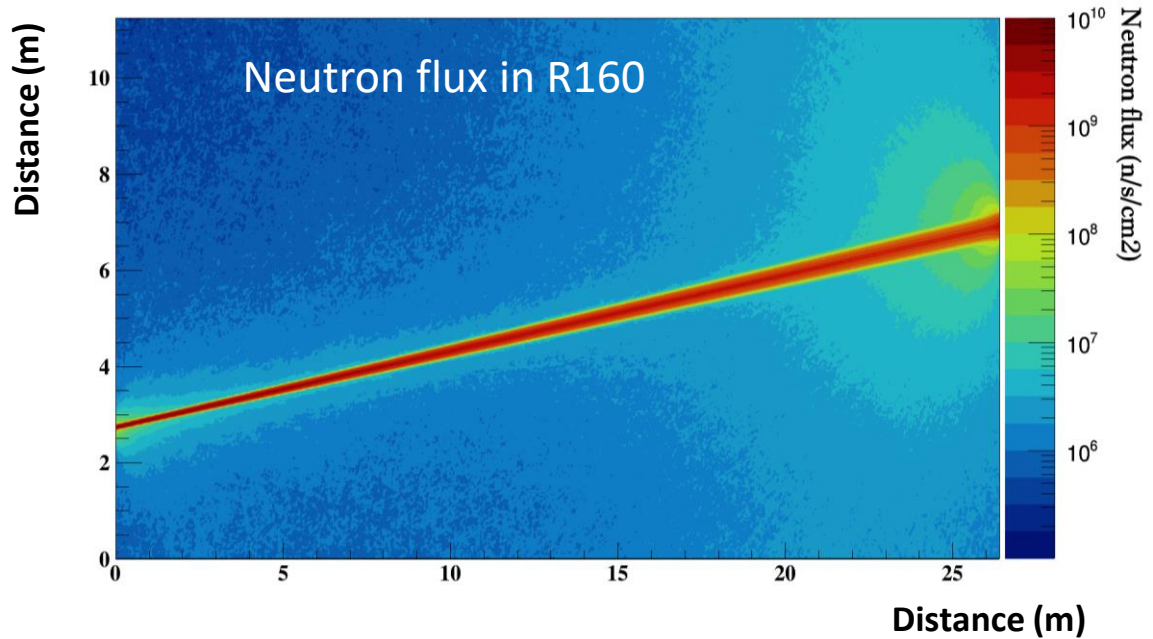
A. Letourneau

IRFU, CEA, Université Paris-Saclay

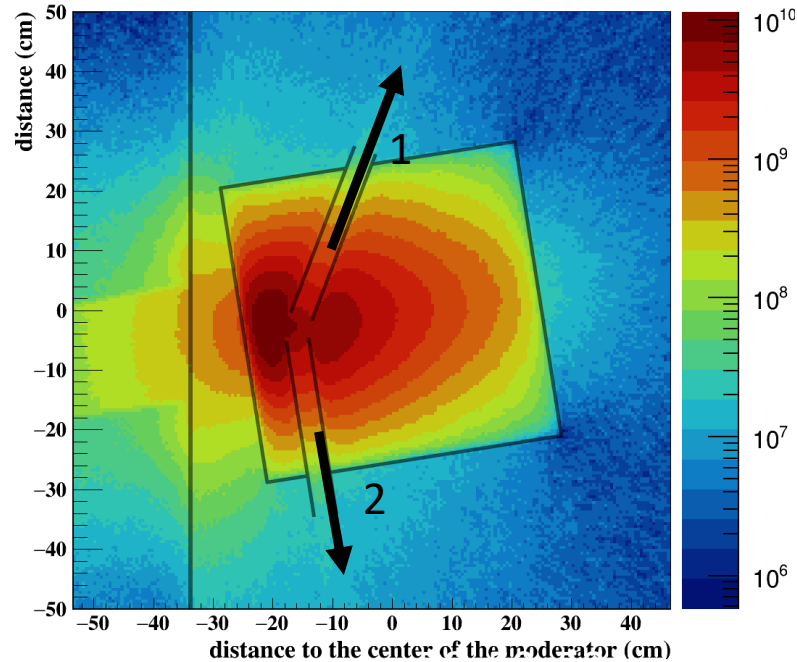
D⁺ beam
@40 MeV



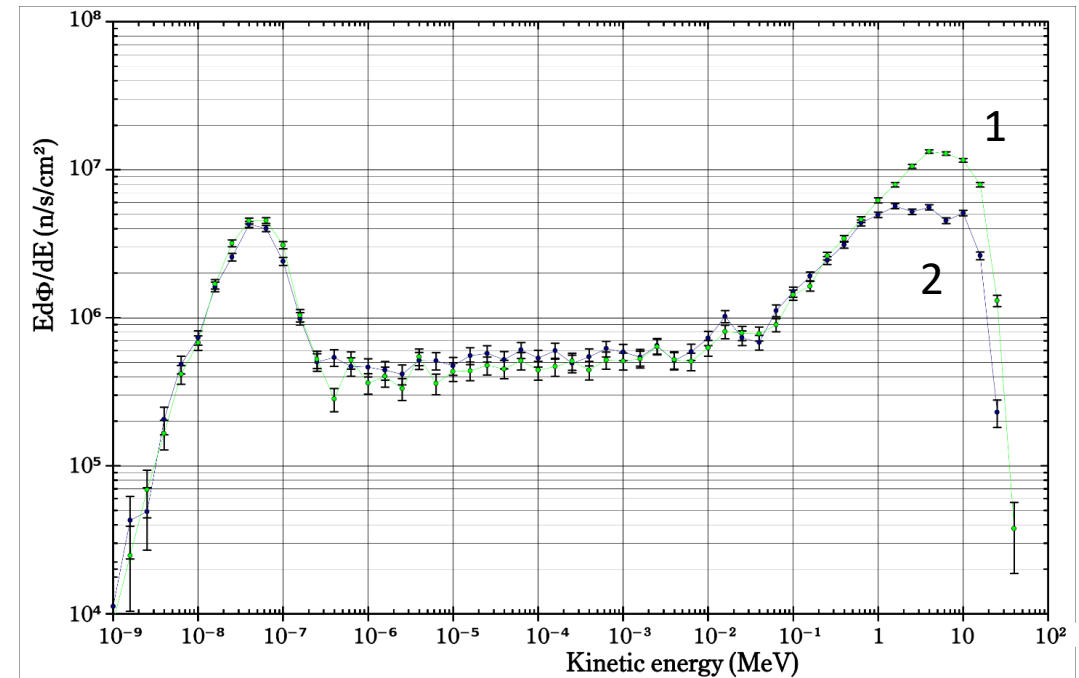




- High flux $2 \cdot 10^{10} \text{ n/cm}^2/\text{s}$ (nominal operation with 125 mA deuteron beam) of collimated neutrons up to 40 MeV
- Neutron irradiation, Radioisotope production, Material doping, Neutron Analysis (FNPGA)



Neutron fluxes at the exit of the extraction tubes



- **Cold/thermal** neutron flux of up to 10^7 n/cm²/s with **large fast** neutron component ($\sim 10^7$ n/cm²/s)
- Neutron irradiation, Radioisotope production, Material Analysis (PGAA), Neutron scattering and imaging

Tibetan bronze Buddha statue



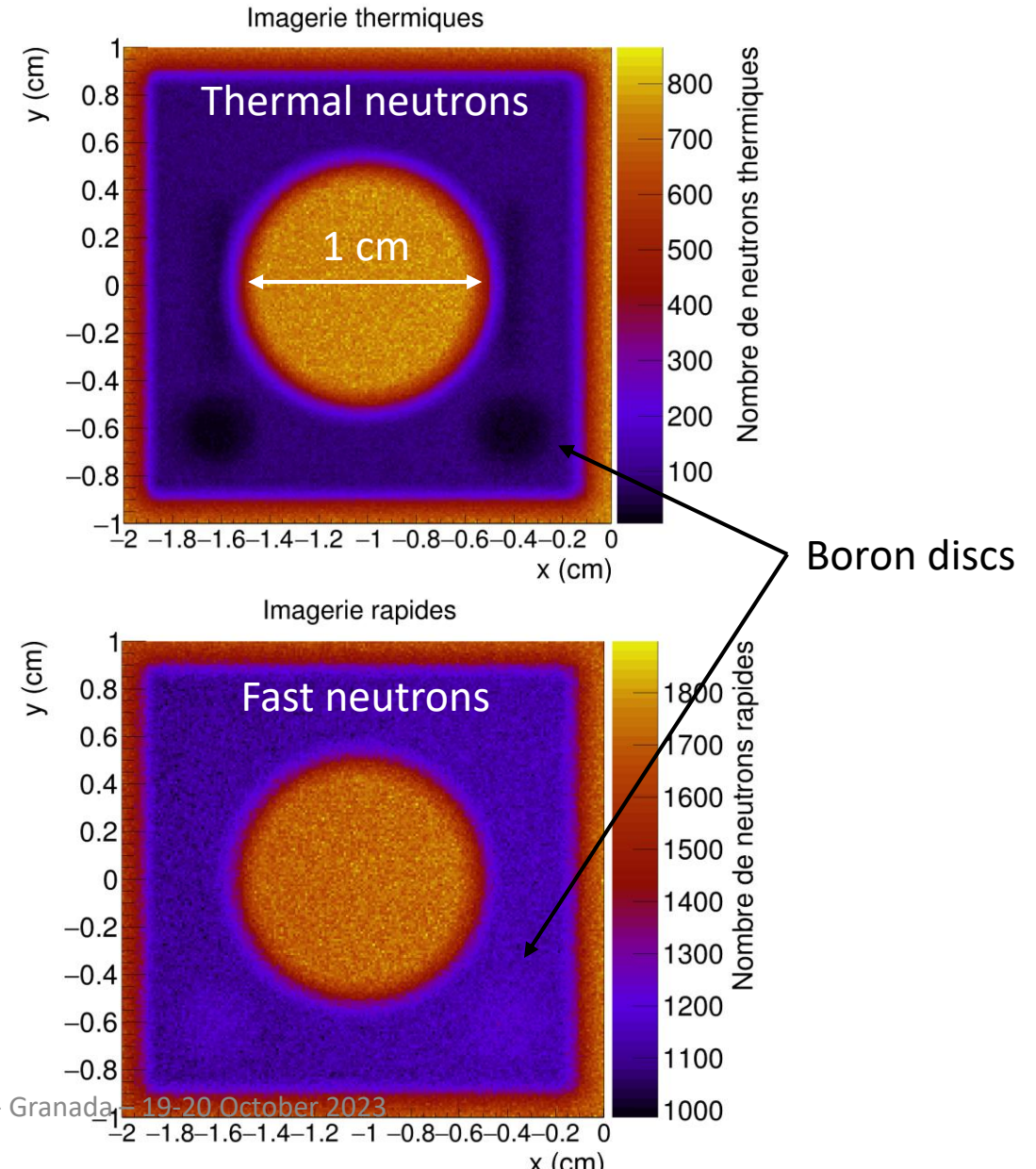
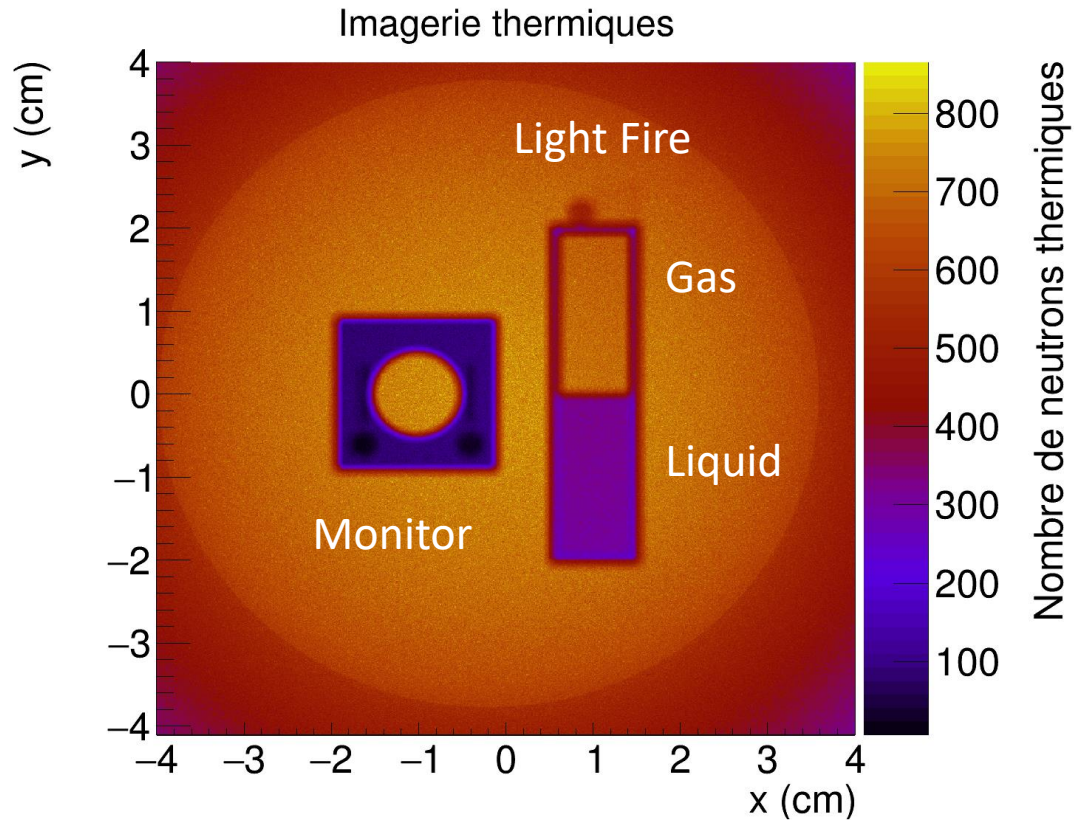
X-ray image



Neutron image



50 μ m resolution



- $2 \cdot 10^5 \text{ n/cm}^2/\text{s}$ thermal and $4 \cdot 10^5 \text{ n/cm}^2/\text{s}$ fast
- $L/D = 50$ (2 m from the moderator)
- Resolution $\sim 500 \mu\text{m}$

- The collimated neutron beam allows IFMIF-DONES to be **a first class** facility for techniques using **fast neutrons** and a **medium flux** facility for techniques using **thermal neutrons**.
 - 9 types of installations/experiments covering **all uses of neutrons** were analyzed
 1. Nuclear and Particle physics with cold and thermal neutrons
 2. Neutron scattering experiments with cold/thermal neutrons
 3. Neutron imaging with fast/thermal neutrons
 4. Neutron irradiations/activations
 1. Fast neutron irradiation of components, devices, bio-samples
 2. Analysis of neutron-rich isotopes by neutron-induced fission
 3. Activation of materials for astrophysics with quasi-stellar moderated neutron beams
 4. Analysis of radioisotope production routes by nuclear decay induced reactions
 5. Characterization of materials by radiation analysis
 5. Medical treatment using neutrons
- IFMIF-DONES Prep Phase Report*
- Experiments **are feasible from a safety** point of view **without involving important** conceptual changes in safety aspects of the facility, except for medical treatments

Concrete optimization and qualification for IFMIF/DONES and fusion program	Tomasz Piotrowski	15'
Impact of installation of the Tritium Release Test Module in the IFMIF-DONES Test Cell on the neutron spectra inside the Complementary Experiments Room collimated by Neutron Beam Tube and Shutter	Arkady Serikov	20'
Current status of design of the neutron beamline and shutter	Santiago Becerril Jarque	15'
Sample preparation and investigation of the neutron spectrum at the DONES facility	Sophia Florence Dellmann	20'
Prospects for neutron imaging at DONES	Carlos Guerrero	20'