

## JoULE Agreement

The LIA\* JoULE, initiated in 2005, is dedicated to research in the areas of neutrino properties, dark matter, ultra heavy ions and low radioactivity measurements.

This agreement has been signed by CNRS-IN2P3 and CEA-DSM, the JINR Dubna and RFBR (Russia) and recently the CTU (Czech Republic).

\* Laboratoire International Associé - International Associated Laboratory



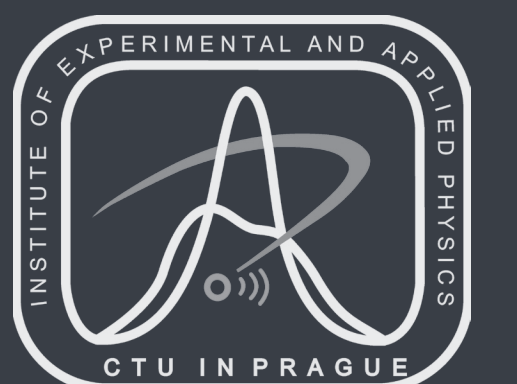
- CNRS / IN2P3 – CEA / DSM, for LSM (Laboratoire souterrain de Modane) - France

- RFBR (Russian Foundation for Basic Research) - Russia

- JINR Dubna (Joint Institute for Nuclear Research) Dzhelopov Laboratory of Nuclear Problems - Russia



- CTU (Czech Technical University in Prague) IEAP (Institute of Experimental and Applied Physics) - Czech Republic



## JoULE Goals

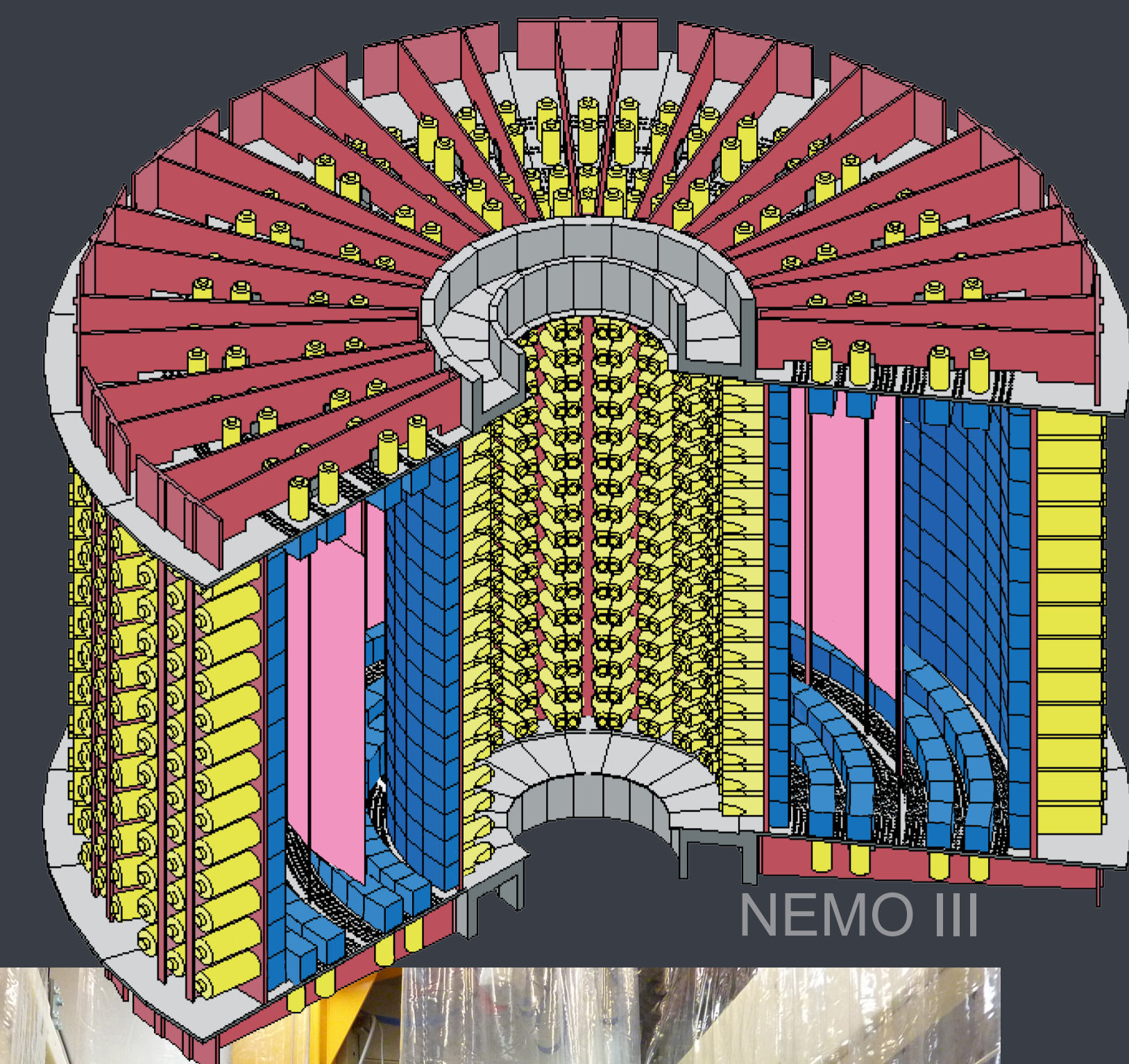
- To promote exchange between France, Russia and Czech Republic for underground physics research
- JINR and CTU physicists contribute to characterize the environment of the LSM (measurement of neutron and radon fluxes)
- JINR and CTU physicists participate in low-background material assay for materials used in present and future experiments at LSM
- Development and construction of neutron detectors, radon detectors and muon detectors by JINR and CTU
- The LSM hosts and provides the facilities to offer the best possible working conditions to JINR and CTU physicists
- Joule agreement sets the basis for the JINR and CTU partnership in the extension of the LSM

**JOULE**  
Joint Underground Laboratories

## JoULE Experiments involved

Experiments which benefit from the Joule agreement:

- NEMO-3 experiment for neutrinoless double beta decay search, and its successor SuperNEMO, and the BiPo detector
- EDELWEISS-2 experiment on direct detection of non baryonic dark matter with cryogenic germanium bolometers and the next phase, the EURECA experiment
- TGV-2 low background spectrometer for studying rare nuclear processes as for example  $2EC(2\nu)$  and  $2EC(0\nu)$  capture by  $^{106}\text{Cd}$
- SHIN experiment directed to search for SuperHeavy elements In Nature
- Low background HP Ge detector for gamma ray spectroscopy



EDELWEISS 2



SHIN

## JoULE Achievements

- Development, construction and installation in LSM of a  $^3\text{He}$  neutron detector for thermal neutron monitoring (JINR)
- Development, construction and installation in LSM of a radon detector with a sensibility of a few  $\text{mBq/m}^3$  (JINR)
- Construction and installation in LSM of an alpha-spectrometer (JINR)
- LSM provides 12 visitors months per year



TGV 2

