

# **The EURISOL facility - radiation protection and radiation shielding issues - A review**

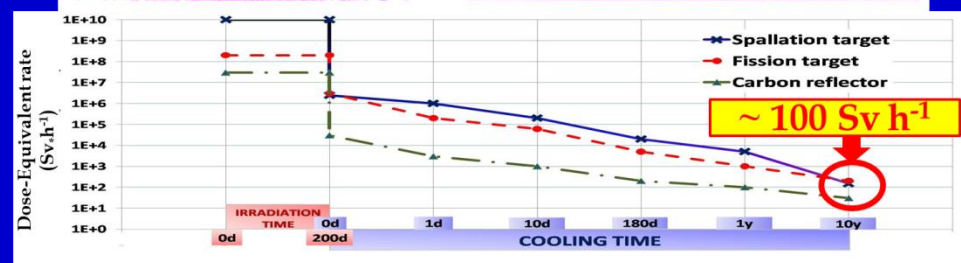
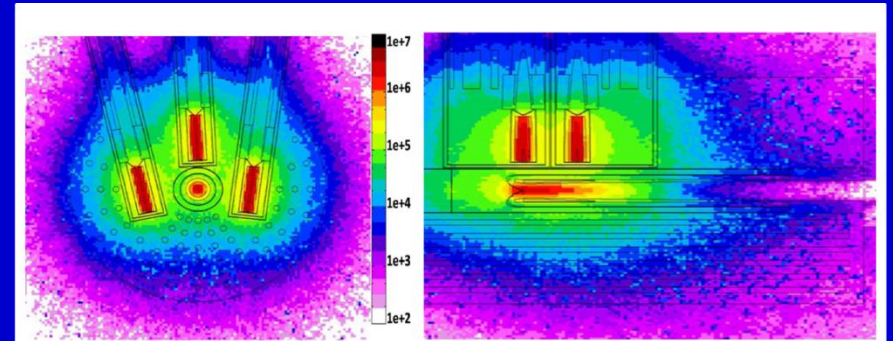
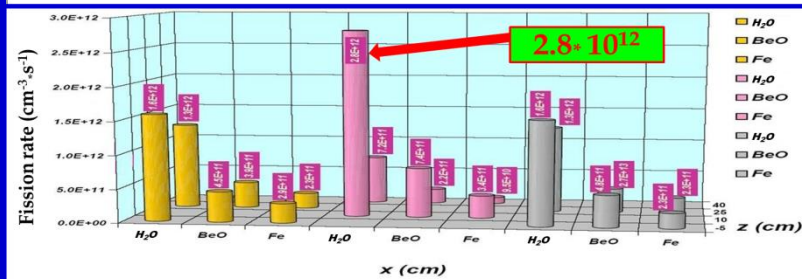
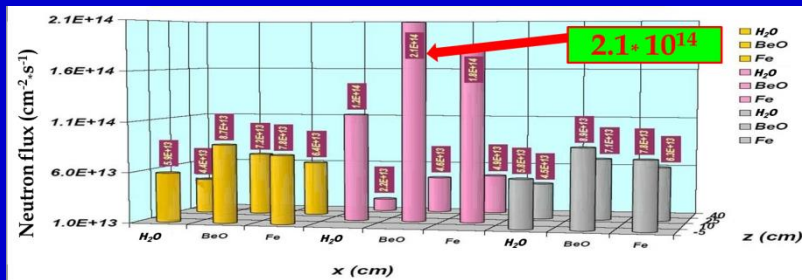
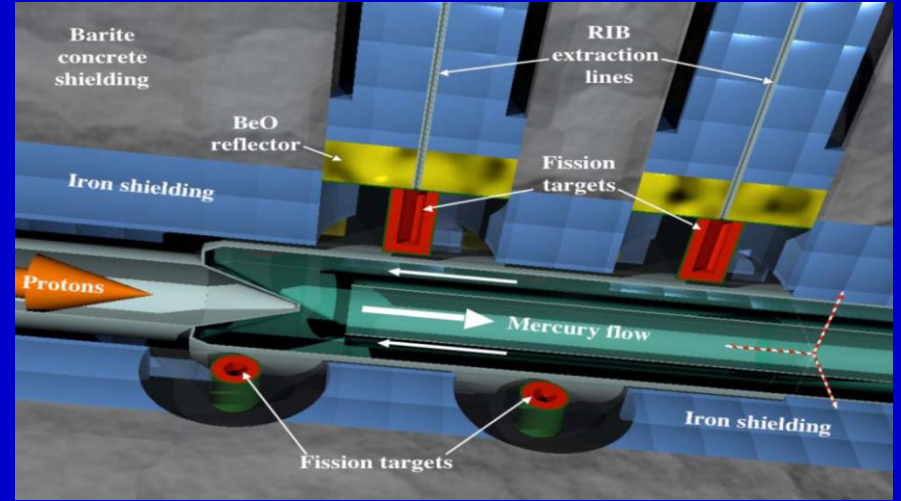
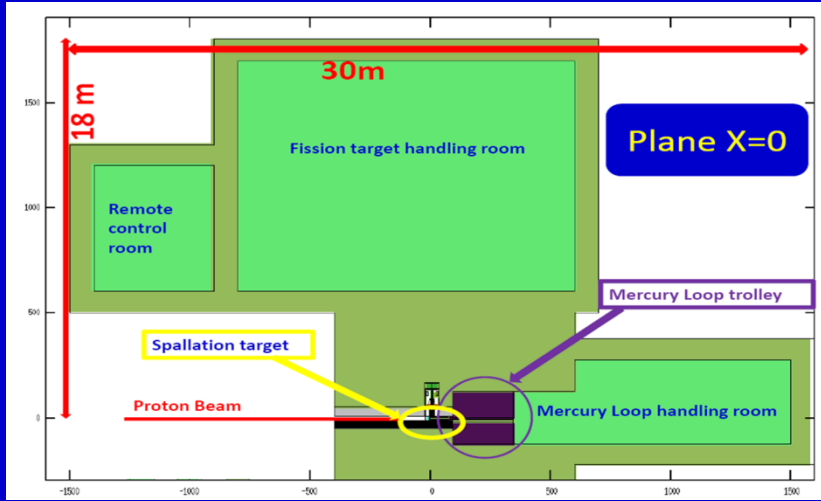
Y. Romanets, R. Luis, P. Vaz

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15-11-2017



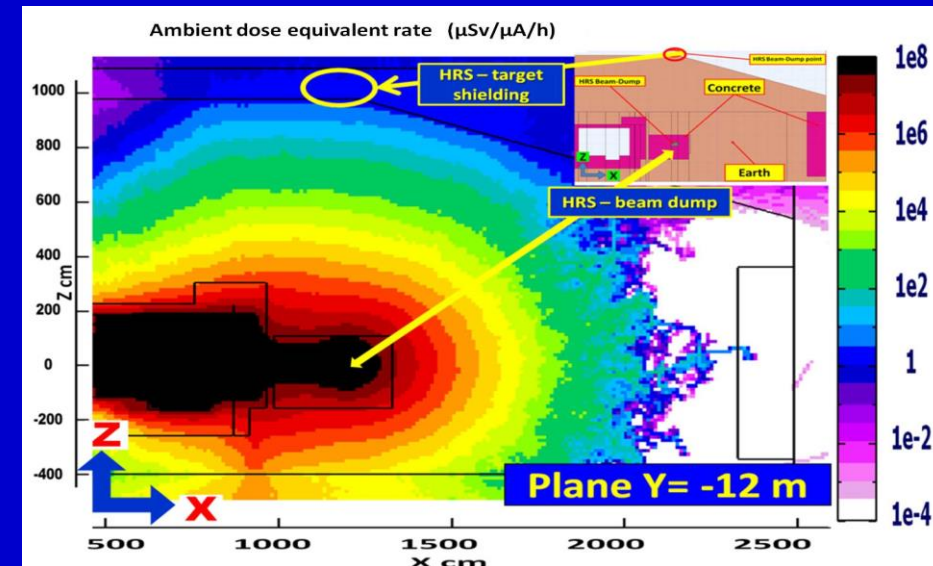
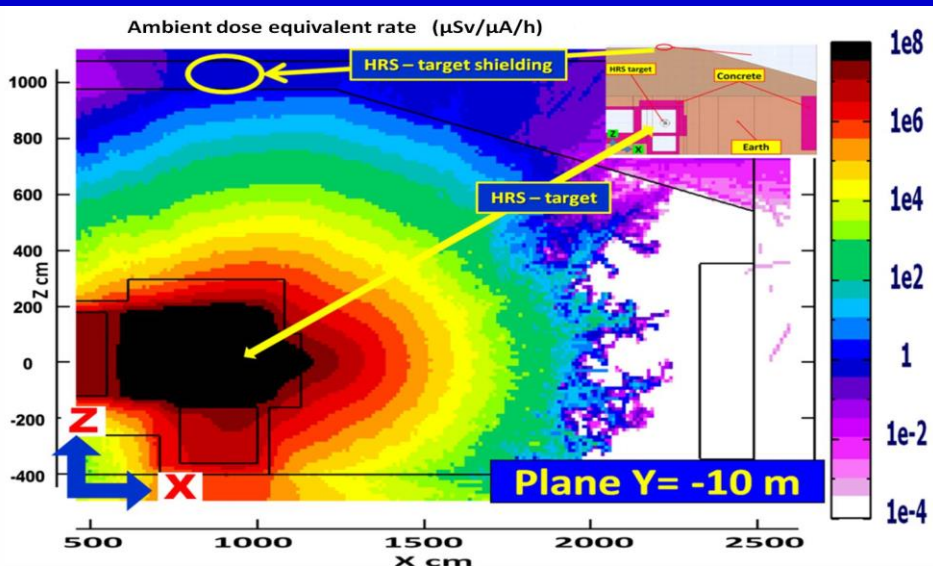
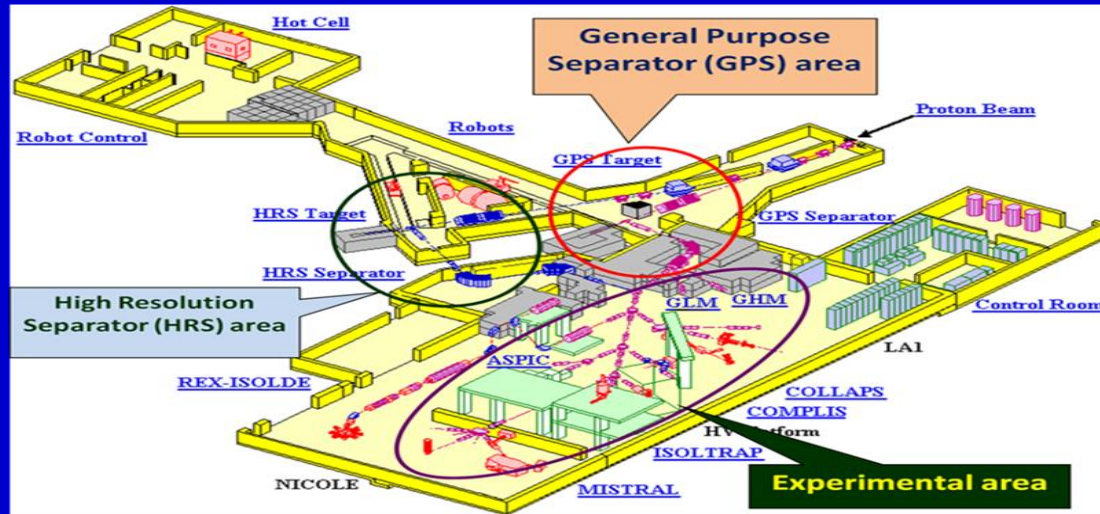
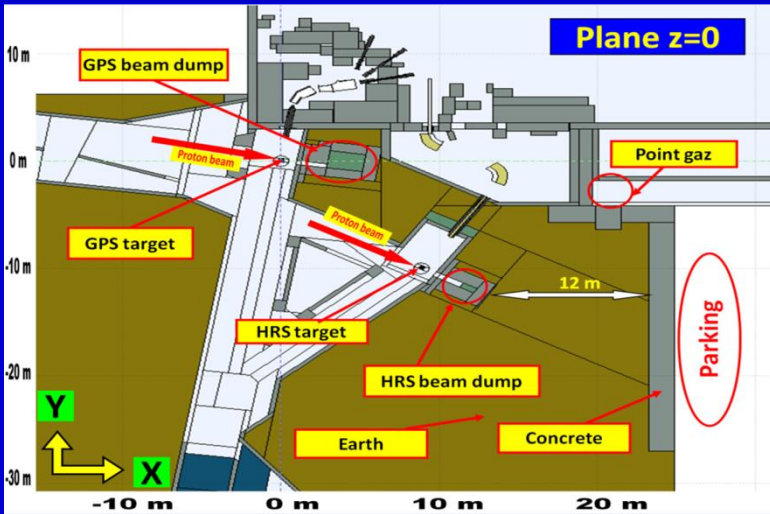






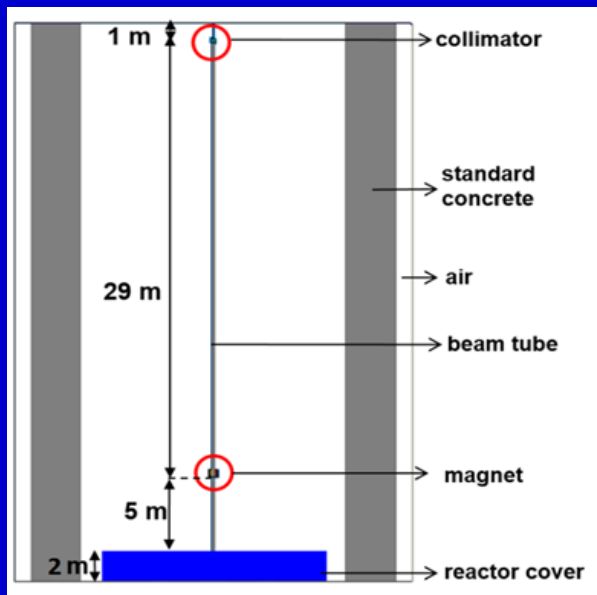
# Simulation results (1.4 GeV proton beam)

FLUKA performed calculations

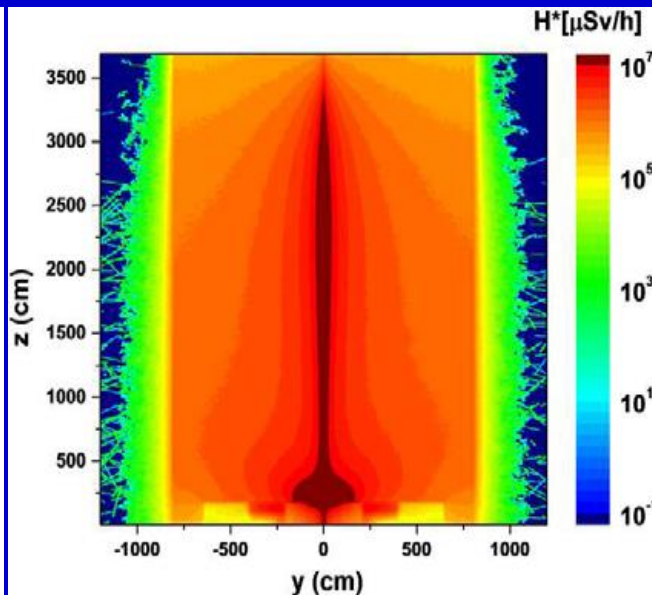




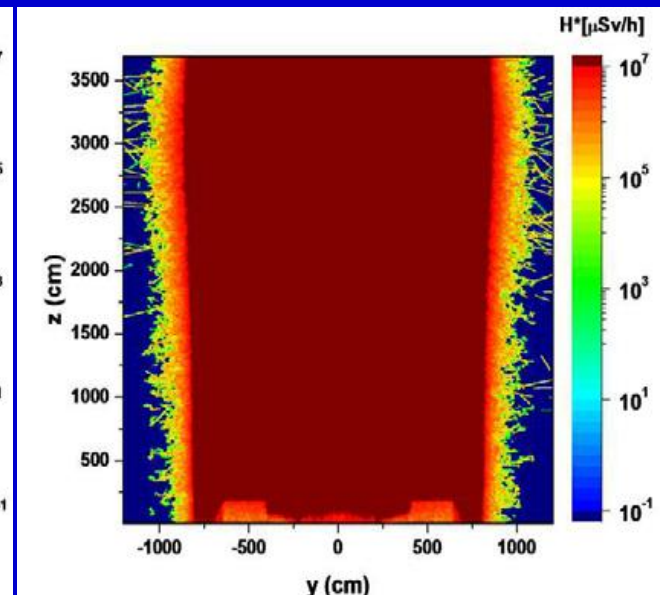
# MYRRHA - Multi-purpose hYbrid Research Reactor for High-tech Applications - the very first prototype of a nuclear reactor driven by a particle accelerator in the world.



**Vertical beam line geometry \***



**Spatial distribution of the dose rate for reference Gaussian source \***

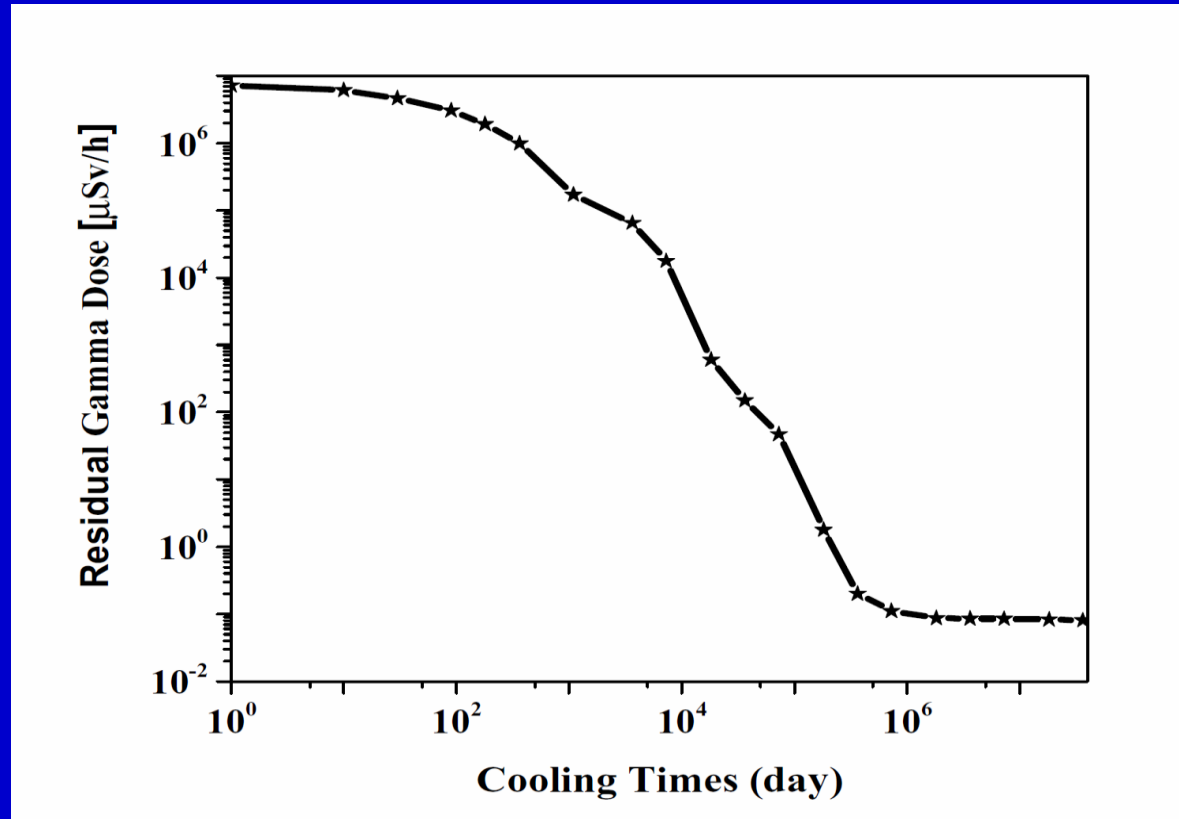


**Dose rate spatial distributions in case of beam loss on collimator\***

\* Neutronic design of MYRRHA reactor hall shielding, Y. Celik, A. Stankovskiy, G. V. den Eynde, EPJ Web of Conferences 153, 03007 (2017), DOI: 10.1051/epjconf/201715303007, ICRS-13 & RPSD-2016



**MYRRHA - Multi-purpose hYbrid Research Reactor for High-tech Applications - the very first prototype of a nuclear reactor driven by a particle accelerator in the world.**



**The residual dose rate in the air at 1 m distance from collimator\***

\* Neutronic design of MYRRHA reactor hall shielding, Y. Celik, A. Stankovskiy, G. V. den Eynde, EPJ Web of Conferences 153, 03007 (2017), DOI: 10.1051/epjconf/201715303007, ICRS-13 & RPSD-2016

**The operation of next-generation nuclear facilities (ADS and RIBs, among others) will be subjected to:**

- ✓ *Unprecedented high particle fluxes*
- ✓ *Very high radiation damage values*
- ✓ *Very high ambient dose equivalent rates*
- ✓ *Very high activation and residual dose rates*

**Radiation Protection and Shielding issues are key elements for:**

- *The safe operation of such facilities*
- *In-Service Inspection and Repair of components*
- *Successful licensing*
- *Smooth decommissioning and dismantling*

**Computational methods and tools like:**

- ✓ *State-of-the-art Monte Carlo simulation programs*
- ✓ *Validated cross-section data sets*
- ✓ *Benchmarked nuclear data models*

**are required and are mandatory for the accurate design of next generation nuclear facilities**

**Severe operational conditions require the solution of common**

- ✓ **multidisciplinary,**
- ✓ **cross-cutting,**
- ✓ **leading edge**

**scientific, technological and engineering challenging issues**