STUMM – a module dedicated for monitoring neutron and gamma radiation fields generated in IFMIF-DONES.

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In order to build future energy tokamaks like DEMO (Demonstration Fusion Power Reactor), the suitable materials for their construction must be ensured to withstand for long time extreme conditions (high radiation and high temperature). IFMIF-DONES (International Fusion Materials Irradiation Facility — DEMO-Oriented Neutron Source) will be built as a powerful neutron source to generate a spectrum similar to that induced in fusion plasma reactors. This device will be dedicated for material testing.

STUMM – Start-up Monitoring Module will be dedicated to measurements of neutron and gamma radiation fields generated in IFMIF-DONS. Construction of this module is proposed by a group from the Institute of Nuclear Physics Polish Academy of Sciences(IFJ PAN) and National Centre for Nuclear Research (NCBJ). The STUMM will be positioned inside the Test Cell (TC) as close as possible behind the DONES neutron source, i.e. the lithium target backplate (BP). STUMM will be working only during the commissioning phase of IFMIF-DONES and will be positioned in the same place as the High Flux Monitoring Module (HFTM) – the module dedicated for irradiation of samples during regular operation of IFMIF-DONES. The geometrical parameters of the STUMM must be fully compatible with the design of the TC and with connections foreseen for others modules inside this cell. Thus, the geometrical design of STUMM will be similar to that of HFTM. The main mission of STUMM is following:

- to characterize the neutron source (energy and space distribution of neutron and gamma fluxes)
- to characterize the flux inside the HFTM (energy and space distribution of neutron and gamma fluxes),
- to verify the results of neutronic calculations of mentioned distributions.

The needs of the sensors to be used in STUMM are connected with the regime of the work of this module. Sensors have to be characterized by a long radiation resistance and relatively small radiation sensitivity.