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Status of the IFMIF-DONES High Flux Test Module

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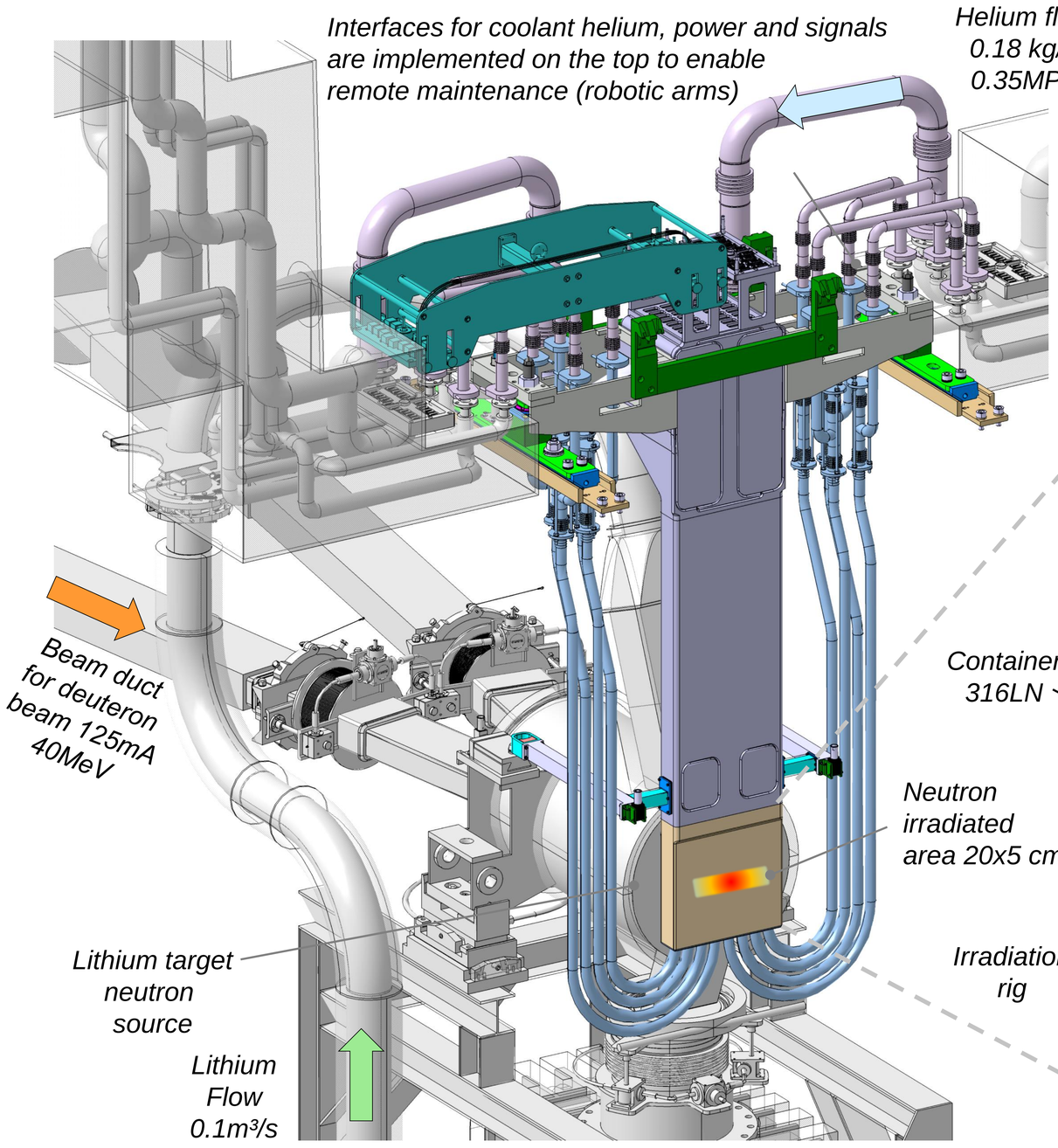
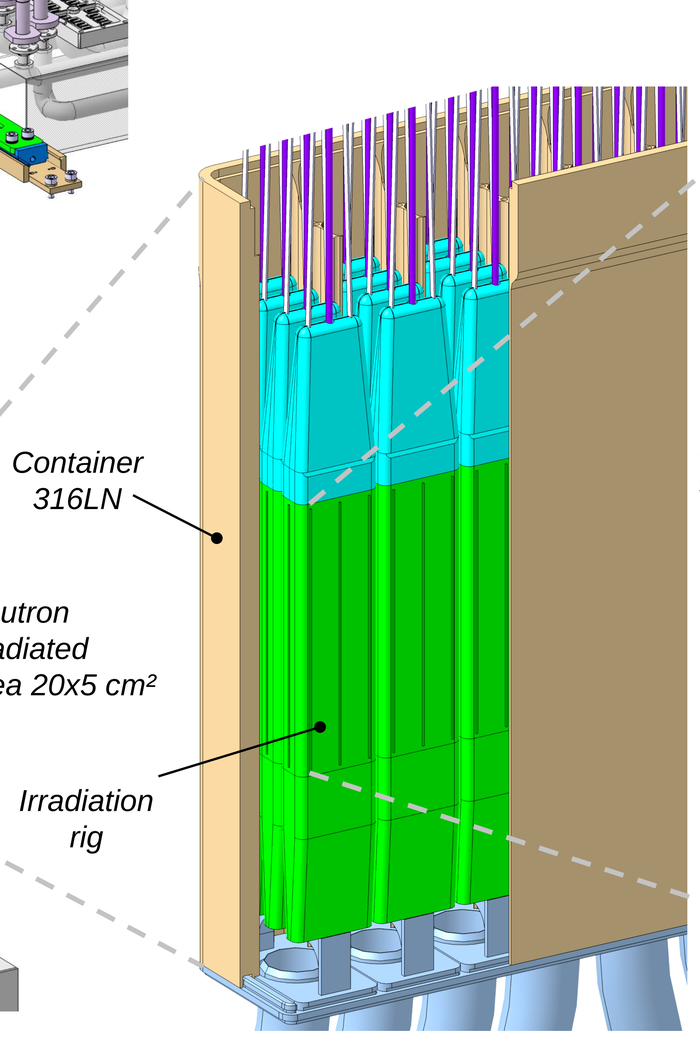
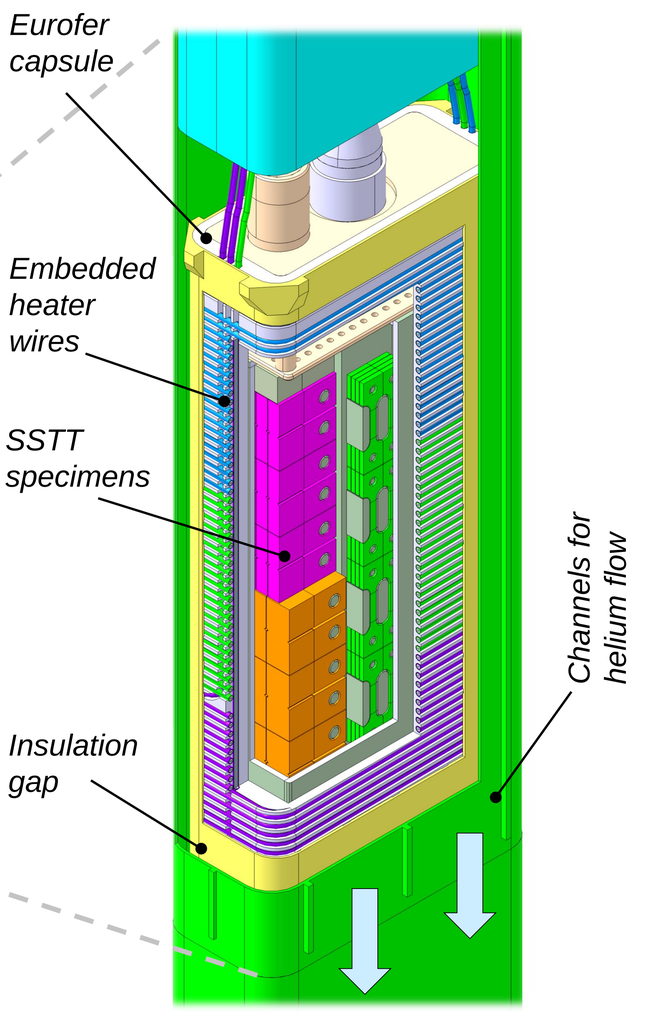


*The **HFTM** as installed behind the neutron source inside the DONES Test Cell*

Objective : Develop an irradiation device for DEMO first-wall materials
5 × 10^{14} n/cm²/s , 50 dpa, 550 °C



*Cut-free **irradiation rigs** Inside the HFTM container*



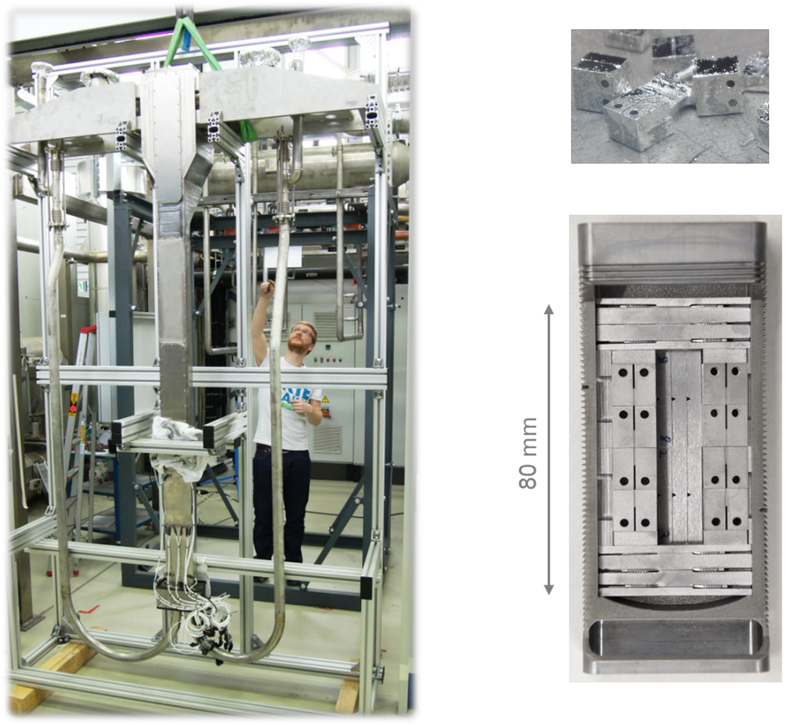
*Cut-free **irradiation capsule with specimens** inside the irradiation rigs*

Challenges

- **The HFTM will be the first pressurized device to be exposed to high doses (50 dpa) of fusion like neutrons ~ 14MeV**
- Lifetime is required 1 – 3 years
- Temperatures span 50 – 550 °C
- Duties of a SIC-2 component

Material selection strategy

- Pressure bearing structure made of X2CrNiMo17-12-12(N) at < 200°C to limit loss of ductility and swelling
- Capsules operated at 250 – 550 °C are made of RAFM steel (Eurofer) without pressure load and without safety function
- Mineral insulated heater wires clad by AISI321 or Inconel
- All electrical insulators in the test cell are based on ceramic/metal assemblies



Highlights of validation activities: HFTM prototype, specimen filled capsule, liquid metal handling

Outlook : IFMIF-DONES is in its construction phase since 10/2023 in Granada, Spain. **Delivery of the first HFTM for irradiation is planned for 2032.** Finalization of specifications, engineering design, manufacturing technologies and test of final-design prototypes is planned as joint effort of KIT, the DONES Project Team and industry.

EUROfusion

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