



MADISON Device



Description

A loop device for irradiation of LWR fuel samples in normal conditions of power reactors

- In JHR reflector
- On displacement system
- Heavy components in cubicle

Type of fuel sample

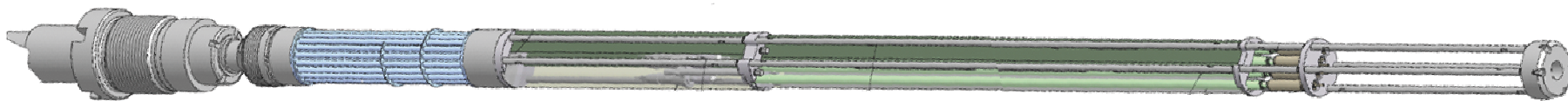
All type of LWR fuel sample

- PWR / BWR and VVER fuel samples
- UO₂ fuels (up to 7% in U⁵)
- MOX fuels (up to 15% in Pu/(U+Pu))
- Fresh fuels
- High burn up fuels (120GW.j/t)

Carrying capacity

Flexible loop with a large carrying capacity

- 4 fuel rods of LHGR \leq 400W/cm and clad diameter \leq 10 mm
- 3 fuel rods of LHGR \leq 400W/cm and clad diameter \geq 10 mm
- 7 fuel rods of LHGR \leq 200W/cm



Type of experiment

Characterization and qualification of fuel samples

- Fuel behaviour vs BU and LHGR
- Long-term irradiations
- (creep, corrosion, crac propagation...)
- Comparison investigations
- Re-irradiation before ramps

Measurements

- Temperature, pressure, water flow
- Precise thermal balance (5%)
- Clad elongation (LVDT)
- Other measurements possible (Fission Products, Non destructive tests...)

Fluid environment

Representative of power reactors

- Thermal-hydraulics of PWR, BWR or VVER
- Chemistry of PWR, BWR or VVER

Performances

Good homogeneity between any 2 identical fuel rods

- 3-5% max. heterogeneity (in case of 4 samples) of linear power
- For all type of fuels / Burn up
- Use of thin neutron screens