D5.10 Report on experiments at JRC Geel using MINERVE samples

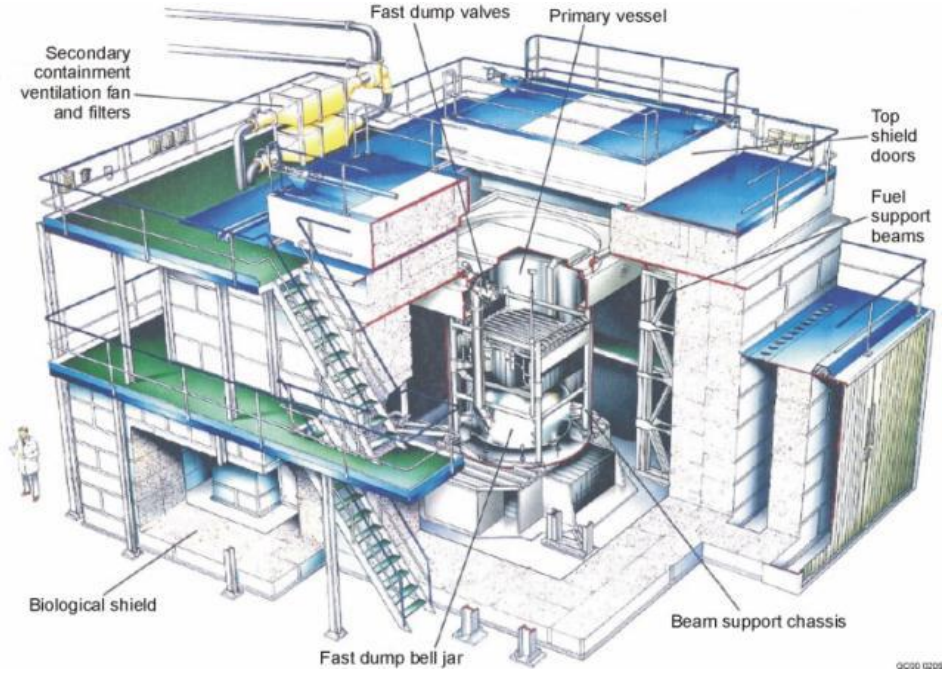
DE LA RECHERCHE À L'INDUSTRIE

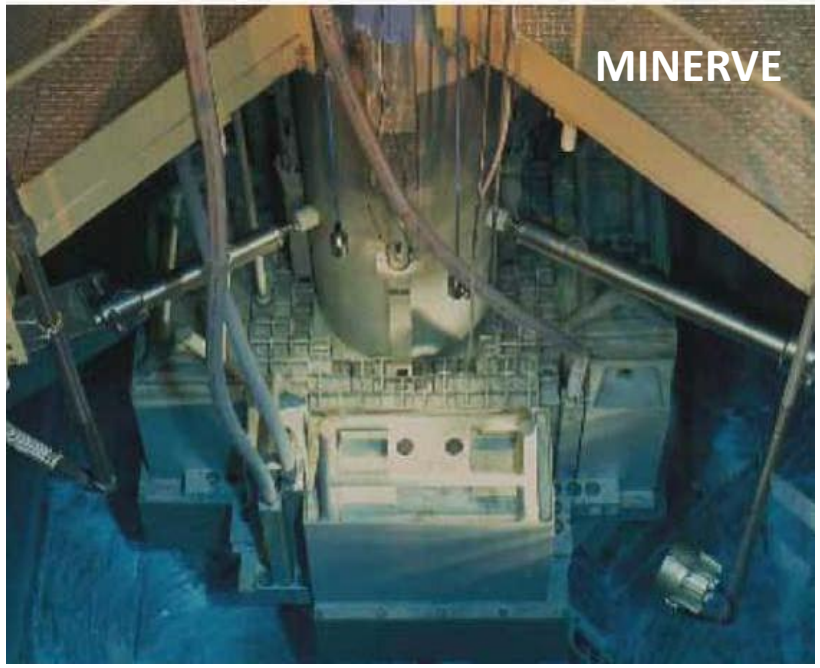
Context

BurnUp Credit program in collaboration between UKAEA/Winfrith and CEA/Cadarache (1992-1995)

Integral measurements performed in the DIMPLE (UKAEA) and MINERVE (CEA) reactors **by using the same samples** in order to validate the neutron capture cross sections of the main fission product of interest for BUC.

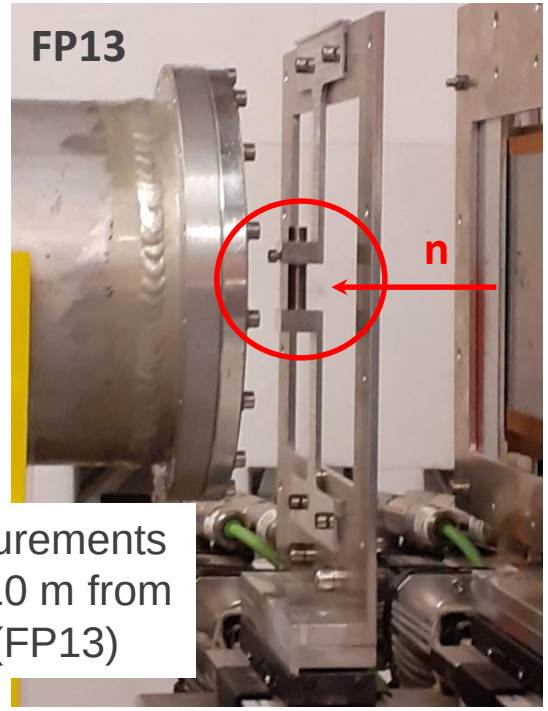
DIMPLE





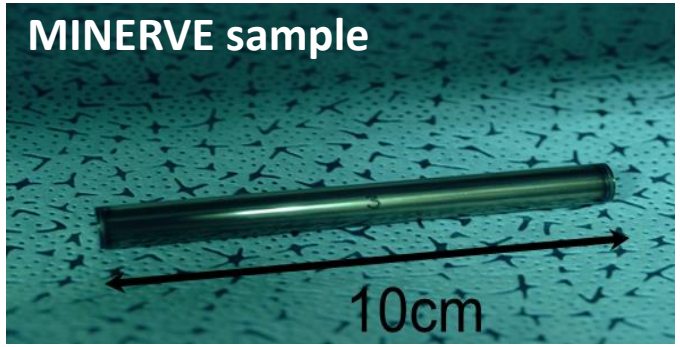
Neutron source GELINA, JRC-Geel, Belgium

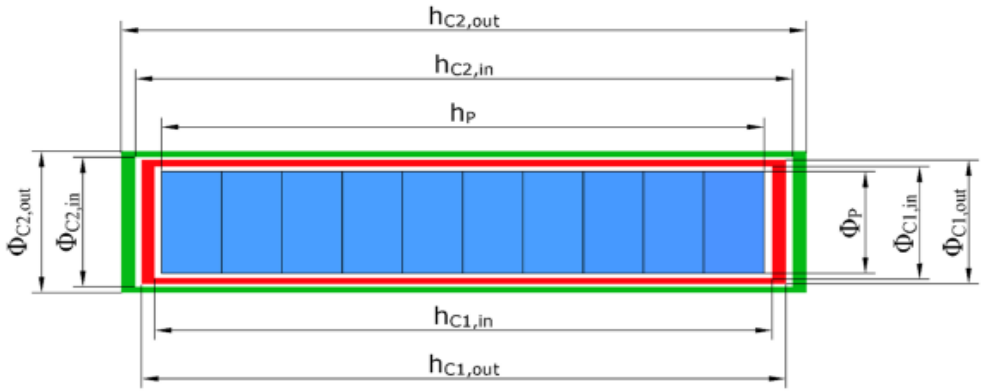
Use transmission experiments to separate the thermal and epi-thermal contributions



Transmission measurements were performed at 10 m from the neutron source (FP13)

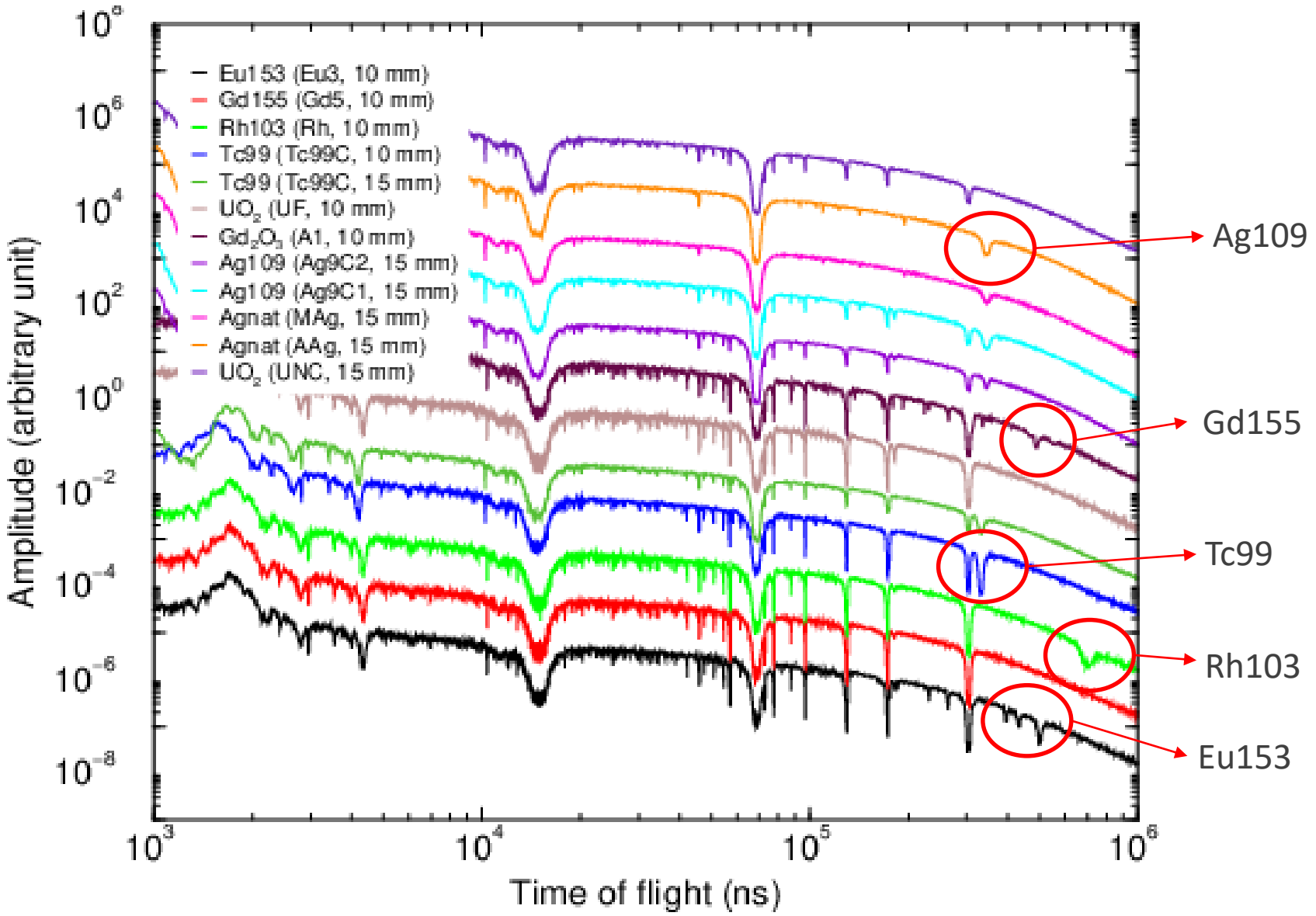
Minerve samples are cylindrical samples (4 or 10 cm long, diameter close to 1 cm) in which Fission Product are mixed to UO_2, Al_2O_3 or water.



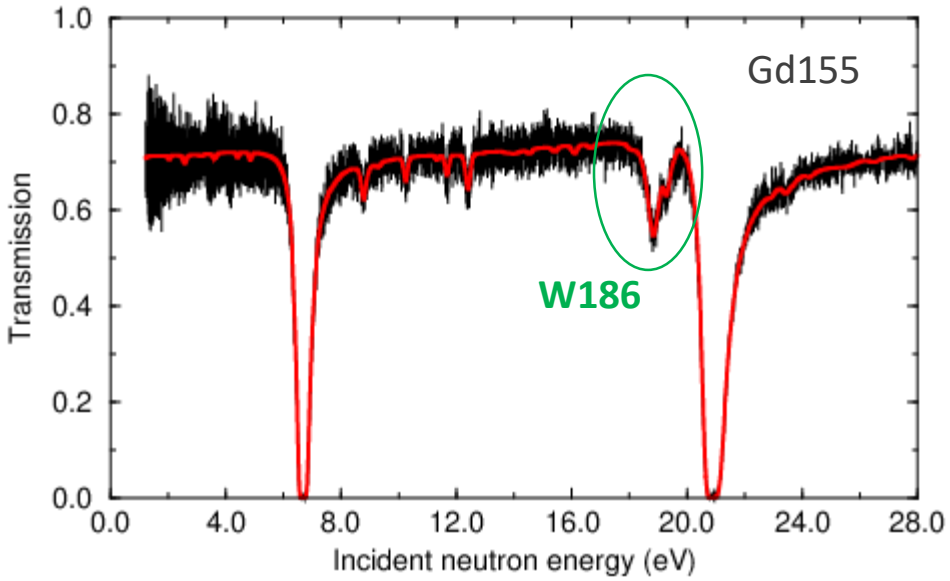


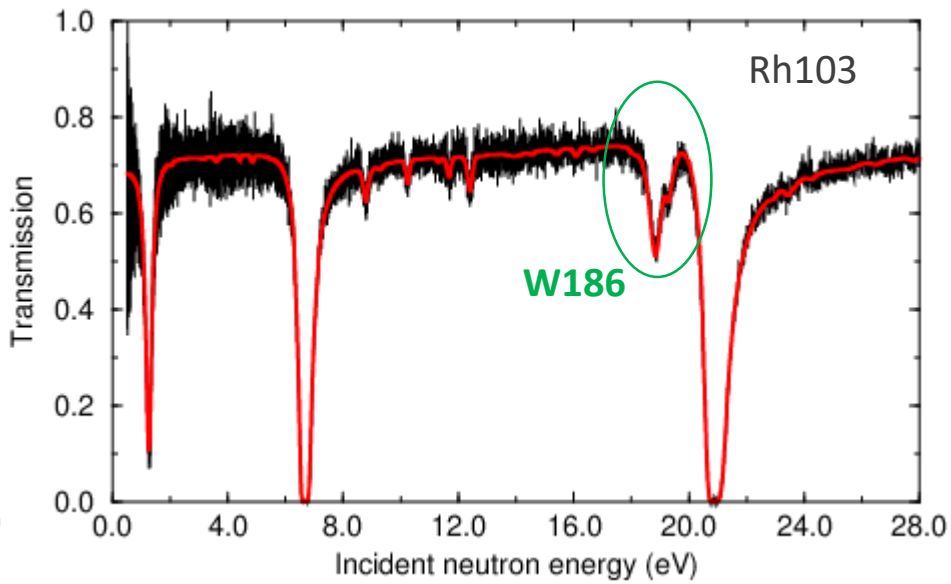
Time of flight spectra Tc99, Rh103, Ag109, Agnat, Gd155, Eu153, UO_2

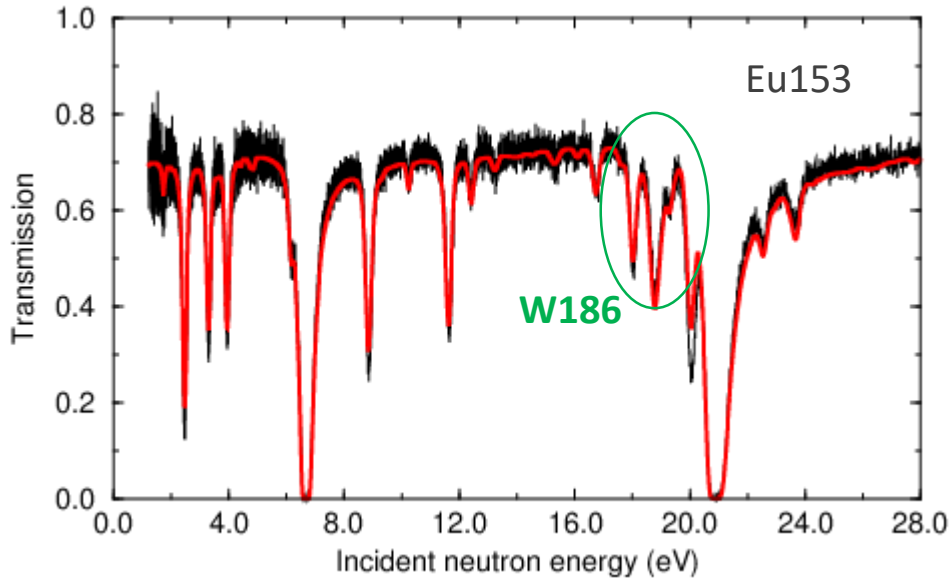
Programme	Type matrice	Dopant
CBU	UO2-nat	-
CBU	UO2-nat	Sm149
CBU	UO2-nat	Sm147
CBU	UO2-nat	Sm152
CBU	UO2-nat	Sm
CBU	UO2-nat	Nd143
CBU	UO2-nat	Nd145
CBU	UO2-nat	Nd
CBU	UO2-nat	Gd155
CBU	UO2-nat	Eu153
CBU	UO2-nat	Rh103
CBU	UO2-nat	Cs133
CBU	UO2-nat	Cs133
CBU	UO2-nat	Rh103
CBU	UO2-nat	Rh103
OCEAN	UO2-nat	-
OCEAN	UO2-nat	Eu151
OCEAN	UO2-nat	Eu153
OCEAN	UO2-nat	Hf180
OCEAN	UO2-nat	Dy160
OCEAN	UO2-nat	Dy161
OCEAN	UO2-nat	Dy162
OCEAN	UO2-nat	Dy163
OCEAN	UO2-nat	Dy164
OCEAN	UO2-nat	Er168
OCEAN	UO2-nat	Er170

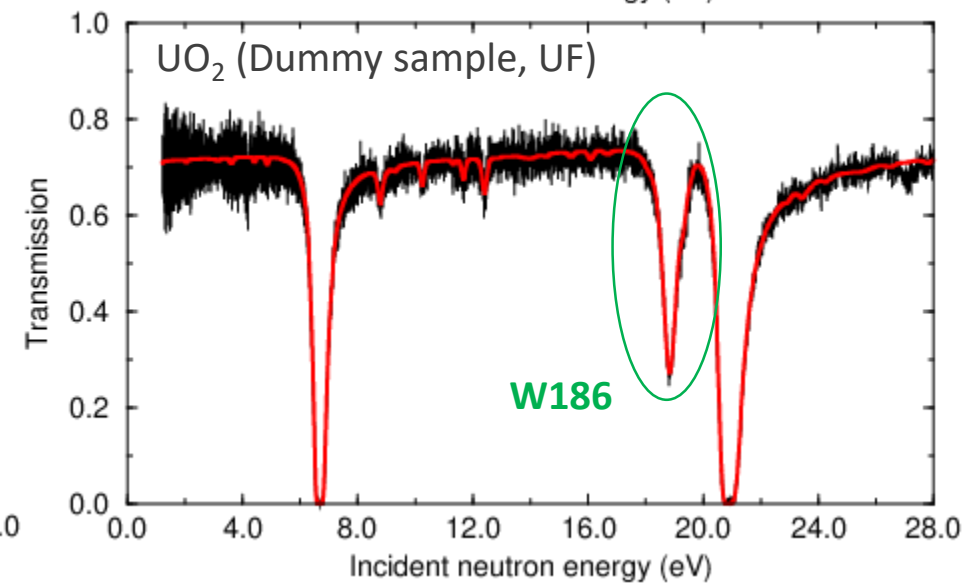


Example of results for Gd155, Rh103, Eu153









Large W contamination in the dummy sample (UO_2) will have a sizeable impact on the C/E results !

Conclusions

30 MINERVE samples containing FP available at JRC-Geel for transmission measurements

- Tc99, Ag109, Ag107, Rh103, Gd155, Eu153, Cs133 completed

Large W contamination of the MINERVE samples is confirmed

- New interpretation of the C/E results in progress by taking into account feedback from GELINA results

Experimental validation of neutron cross sections with the Monte-Carlo code TRIPOLI4 in progress

- The MINERVE program @ JRC-Geel will be useful to test FP selected for JEFF-4Tx