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## IAEA Nuclear Material Round Robin 2015

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DE LA RECHERCHE À L'INDUSTRIE



# IAEA NUCLEAR MATERIAL ROUND ROBIN 2015

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DEN, DEC, SA3C

Laboratory of Radiochemical and Chemical Analyses  
(LARC)

# CEA Cadarache : LARC

- One of the tenth CEA centers,
- Department of Nuclear Fuels : Interest for uranium measurements
- In our building:  
No glove boxes, no hotcells  
Pu limitations :  $1.3 \cdot 10^4$  Bq



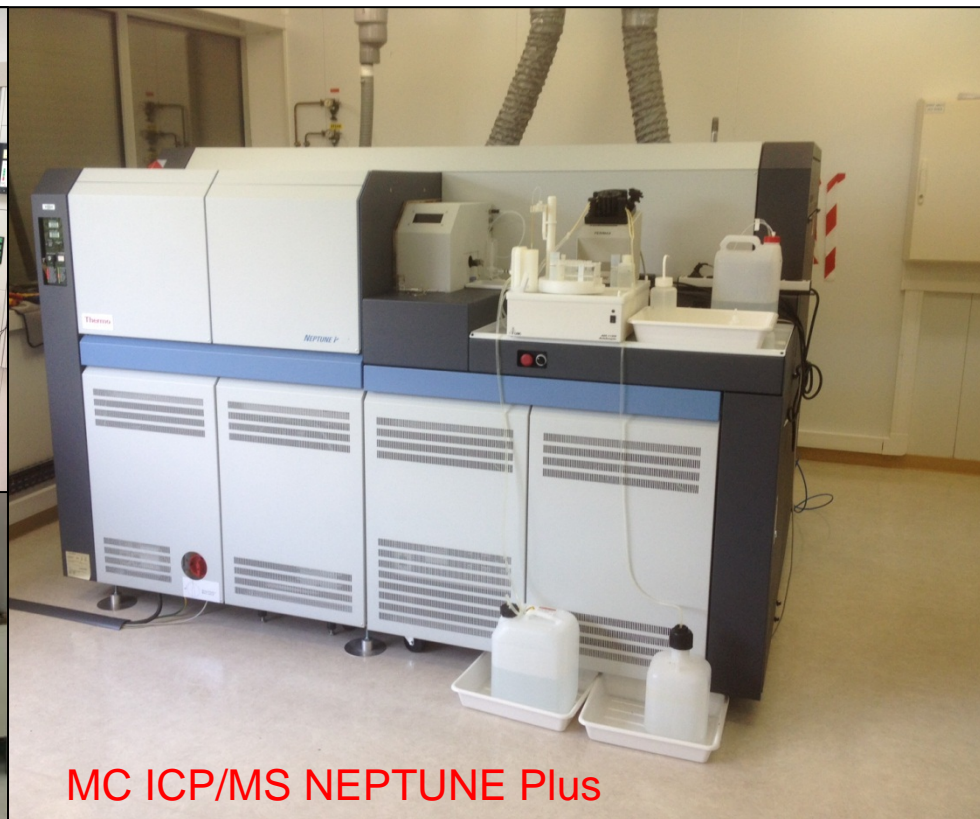
Cadarache



LC-ICP/MS PE Elan



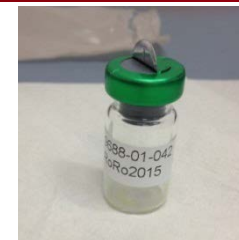
ICP/AES ActivaM Horiba



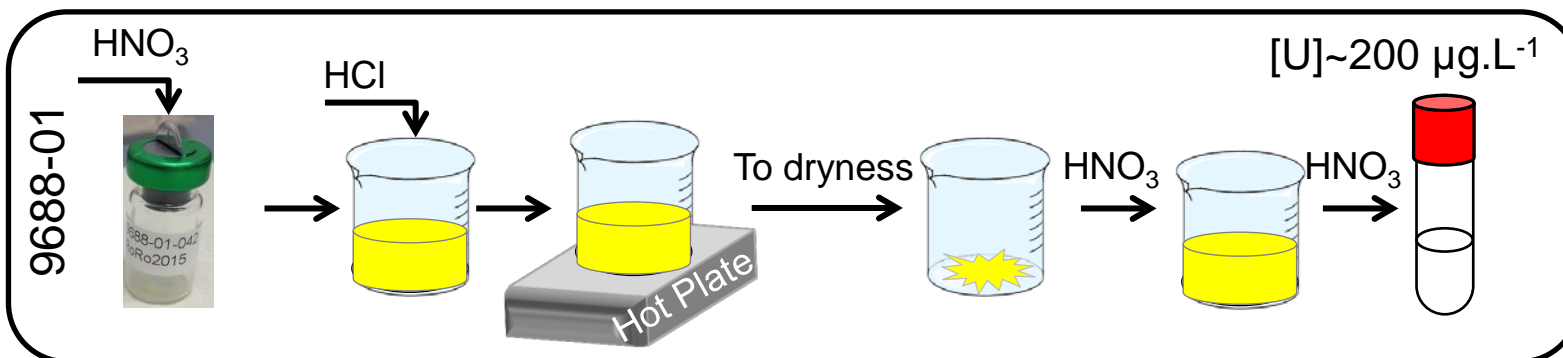
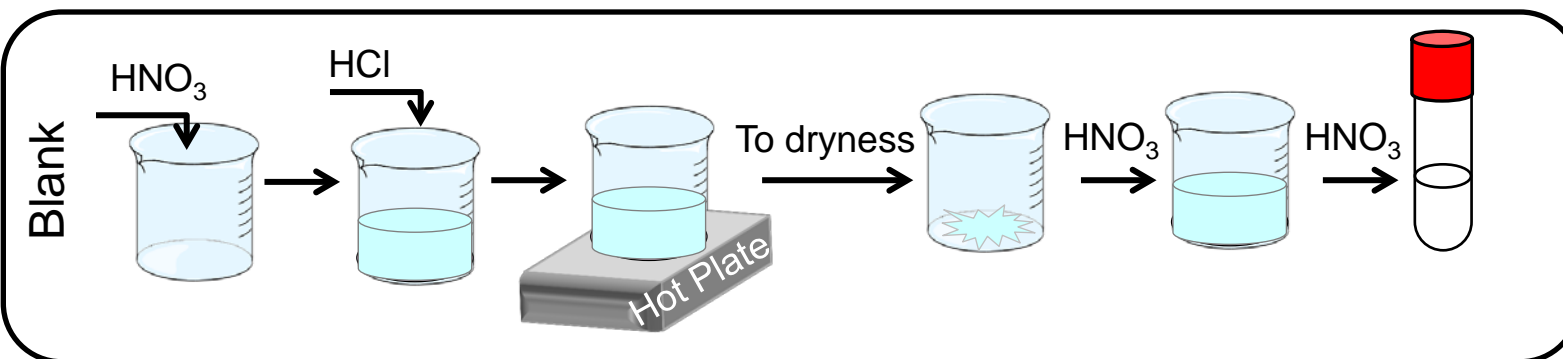
MC ICP/MS NEPTUNE Plus

# Sample receipt and treatment

- Shipment
- ✗ Not allow to receive Pu and mixed U-Pu samples
- ✓ Reception of the uranium nitrate sample 9688-01 (23<sup>th</sup> january 2015)

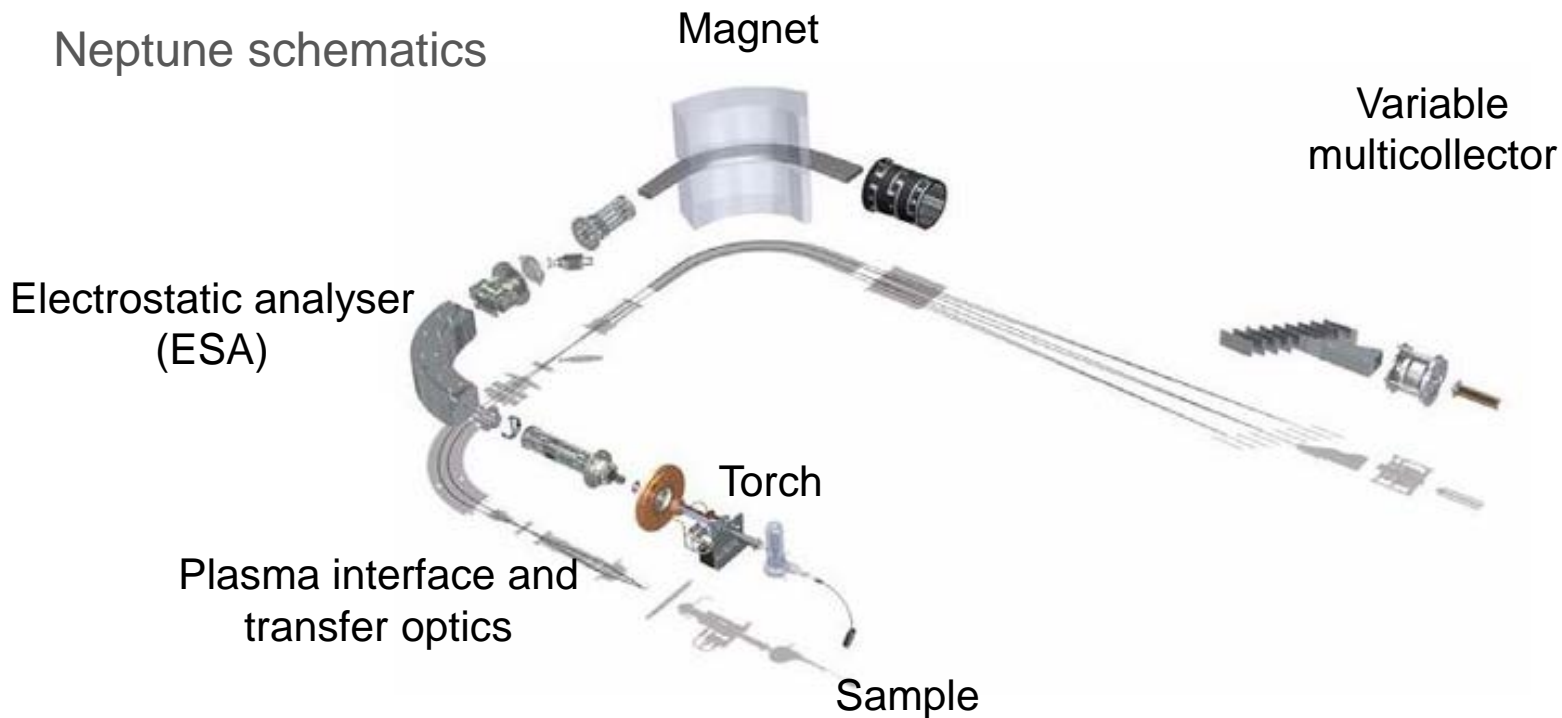


- Treatment



# MC ICP/MS instrument

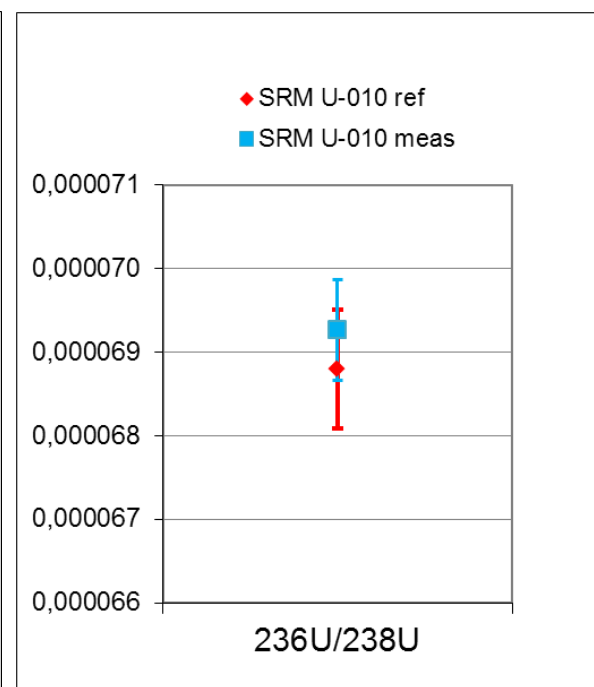
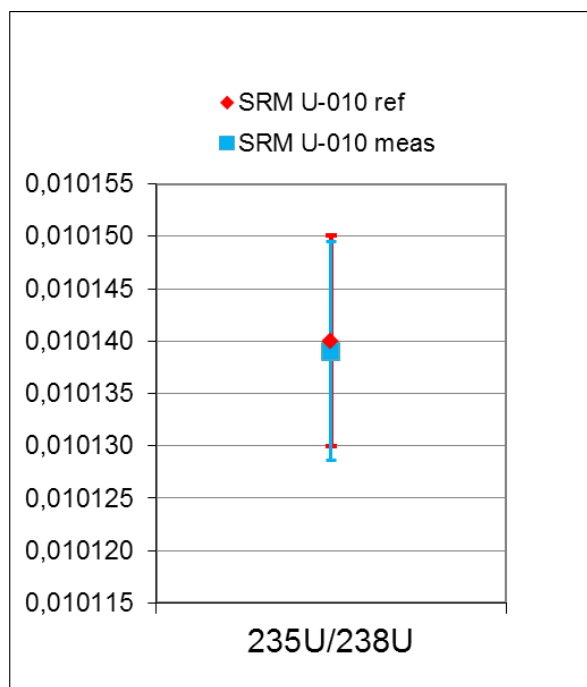
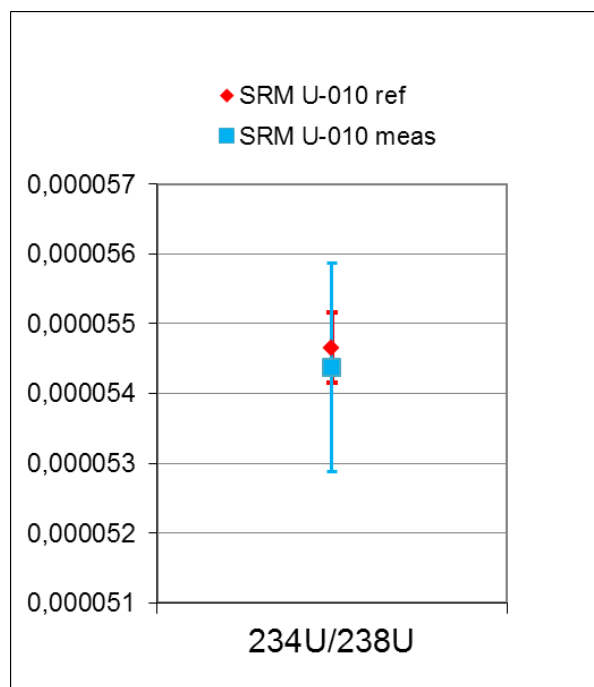
- Neptune schematics



Cup configuration				
L3 (mobile)	L2 (mobile)	L1 (mobile)	C (fixed)	H1 (mobile)
$^{234}\text{U}$	$^{235}\text{U}$	$^{236}\text{U}$	$^{238}\text{U}$	$^{238}\text{U}^1\text{H}$

# Isotopic ratios measurements

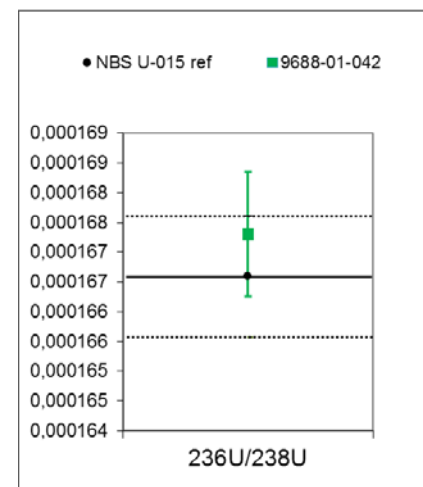
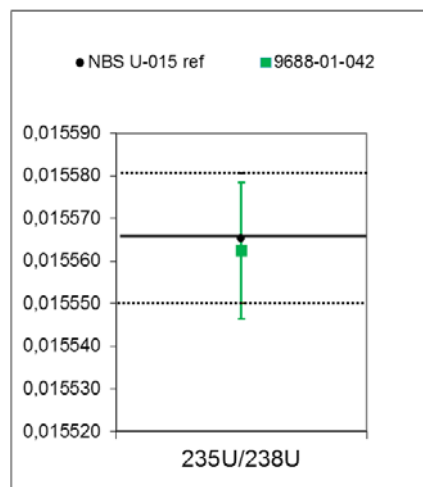
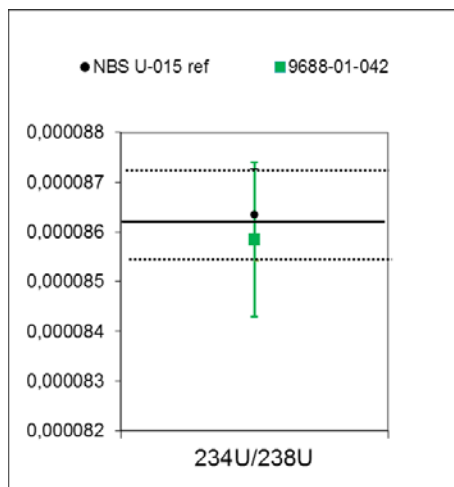
- Mass bias correction using the Sample standard bracketing (SSB) method
- Materials : SRM U-050 used to correct instrumental bias  
SRM U-010 used to control the mass bias correction applied



# Results and comparison to NBS U-015

- Mean of the 3 measurements and associated uncertainties (given with a coverage factor equal to 2)
- Comparison with NBS U-015 uranium isotopic standard

Material		$^{234}\text{U}/^{238}\text{U}$	$^{235}\text{U}/^{238}\text{U}$	$^{236}\text{U}/^{238}\text{U}$
NBS U-015	Value	0.0000863	0.0155654	0.0001666
	Uncertainty (k=2)	0.0000009	0.0000152	0.0000010
9688-01-042	Value	0.0000858	0.0155624	0.0001673
	Uncertainty (k=2)	0.0000015	0.0000160	0.0000010



# Acknowledgments

- Nadège and Christophe for the analyses

