Experiment Talks (RIXS/XES)

A new x-ray emission spectrometer is available at the CLÆSS beamline of ALBA

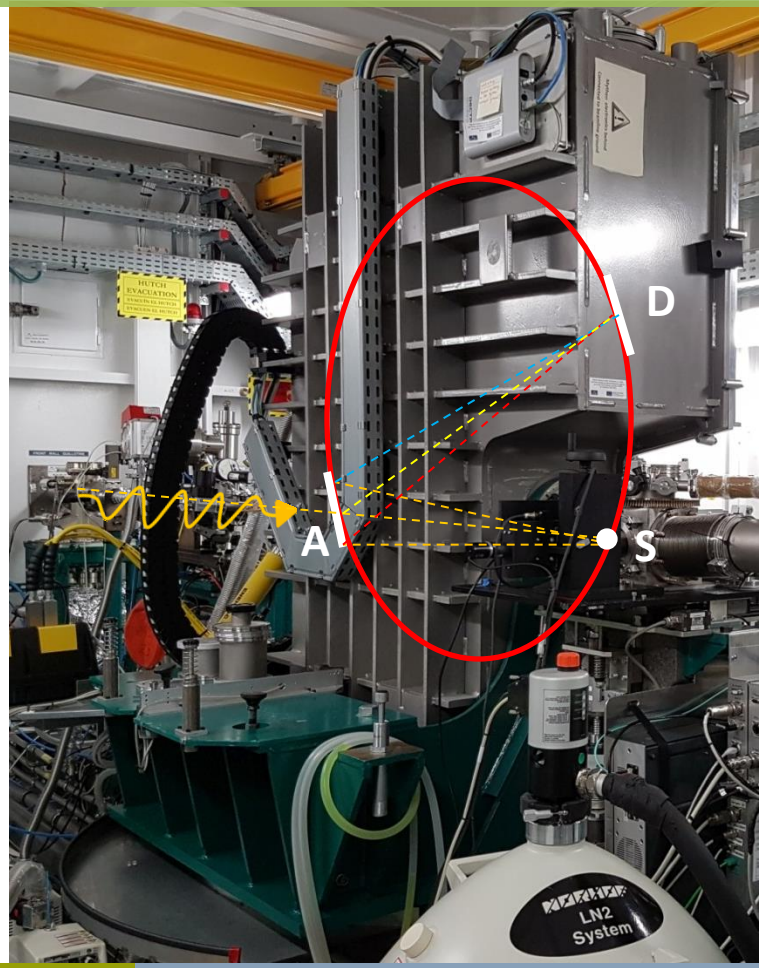
Laura Simonelli

CLÆSS beamline responsible

A new x-ray emission spectrometer is available at the CLÆSS beamline of ALBA

The CLEAR spectrometer:

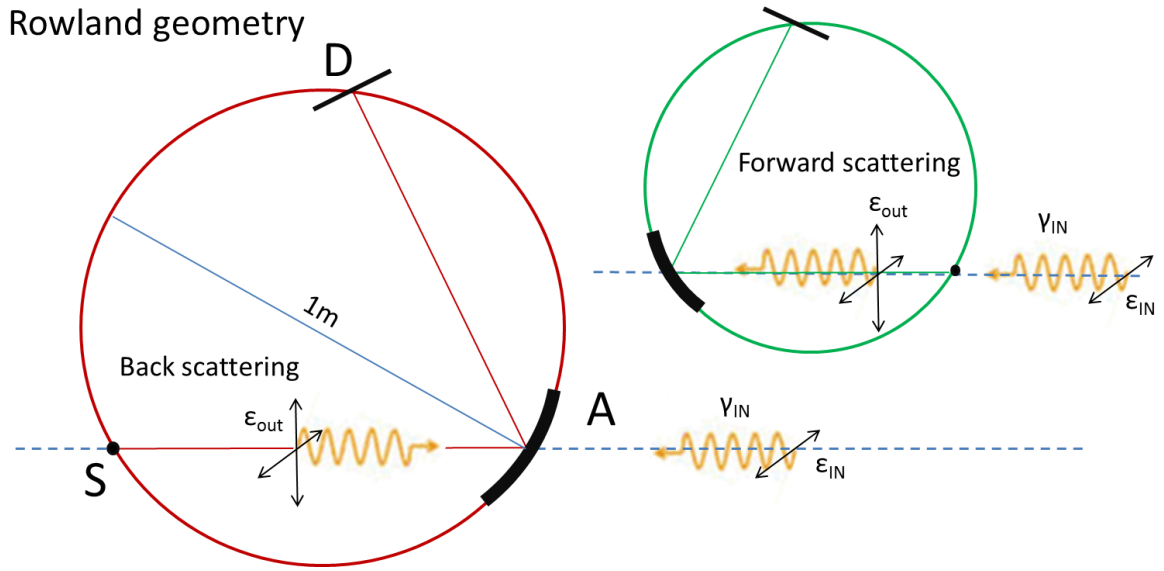
- Scattering geometry
- Energy range
- Energy resolution and dispersion
- Spectra and acquisition time
- Some scientific results

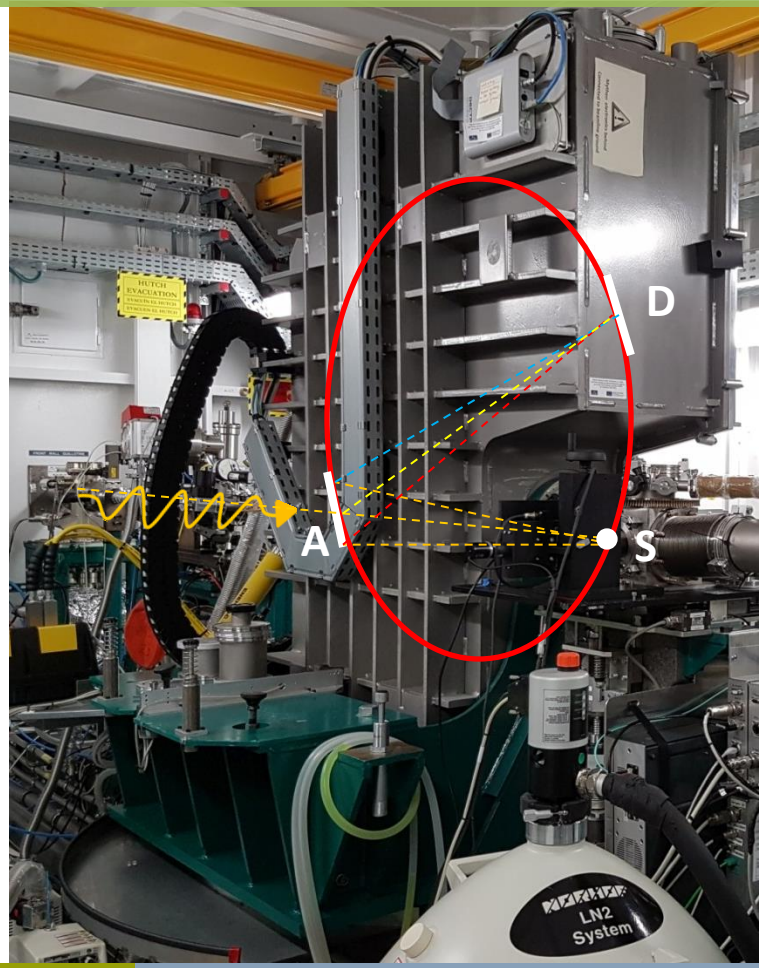


A new x-ray emission spectrometer is available at the CLÆSS beamline of ALBA

The CLEAR spectrometer:

- Scattering geometry:
  fully back-scattering (forward-scattering)

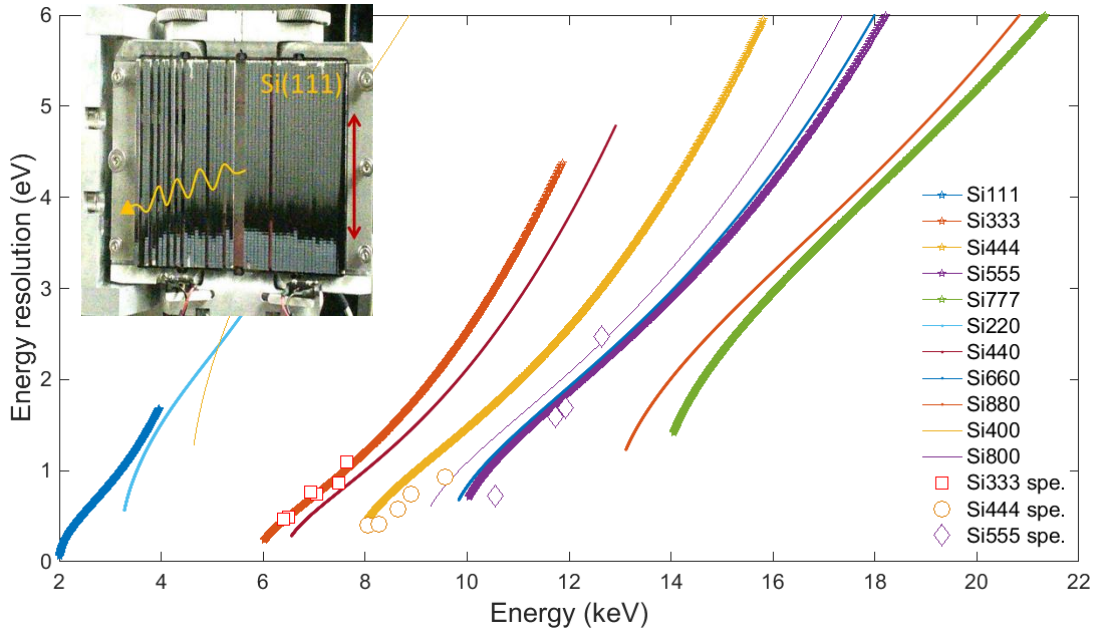


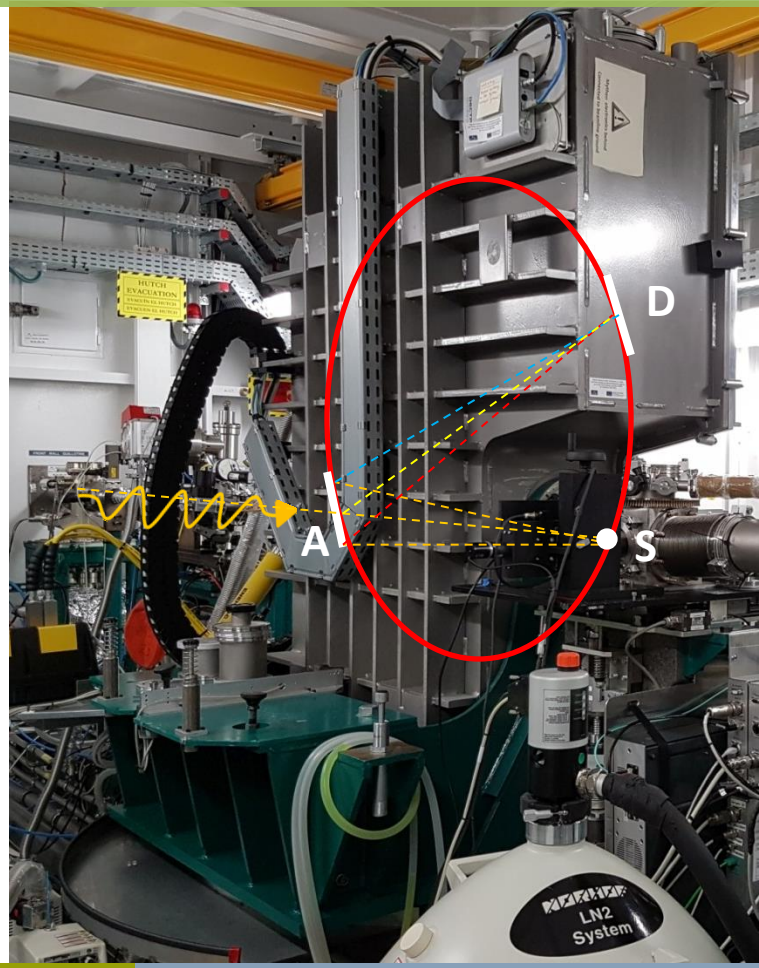


A new x-ray emission spectrometer is available at the CLÆSS beamline of ALBA

The CLEAR spectrometer:

- Energy range: 6.4-12.6 keV
- Energy resolution: 0.35-3eV. Source, diced and pixel size contributions





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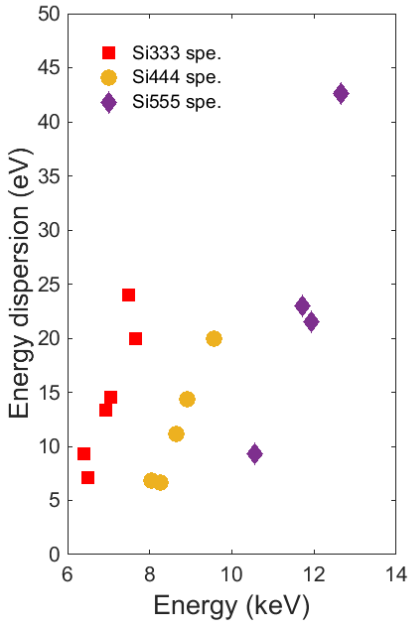
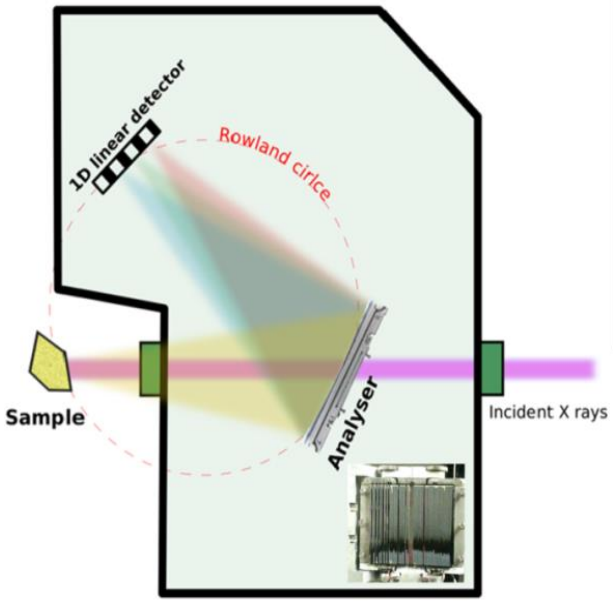
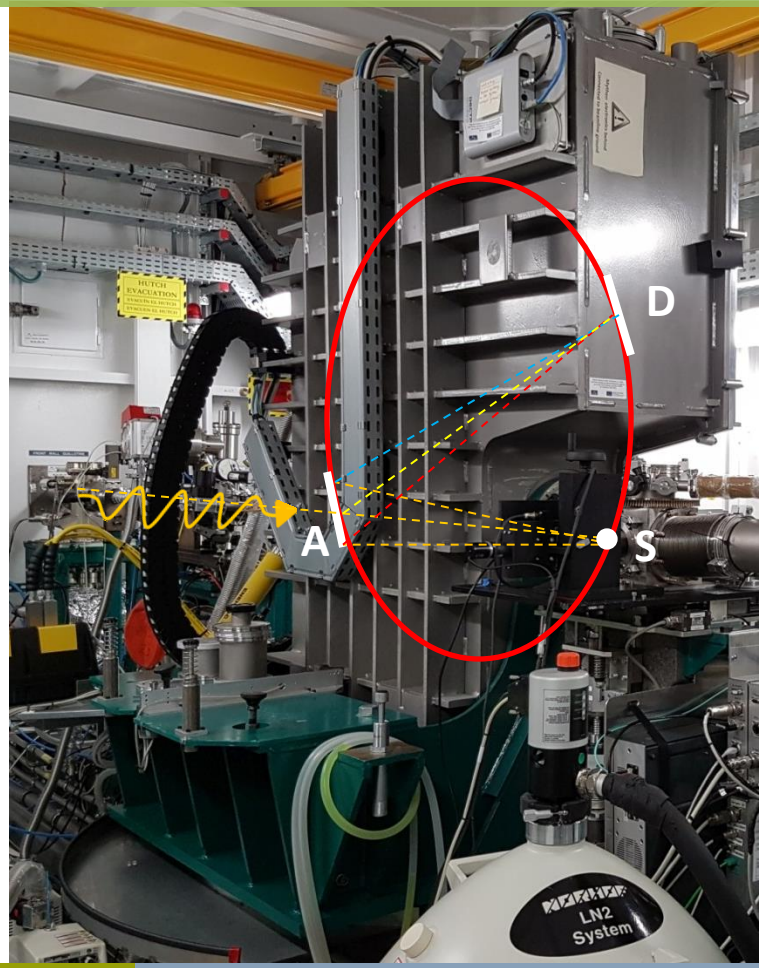
The CLEAR spectrometer:

- Energy range: 6.4-12.6 keV
- Energy dispersion: 7-45 eV







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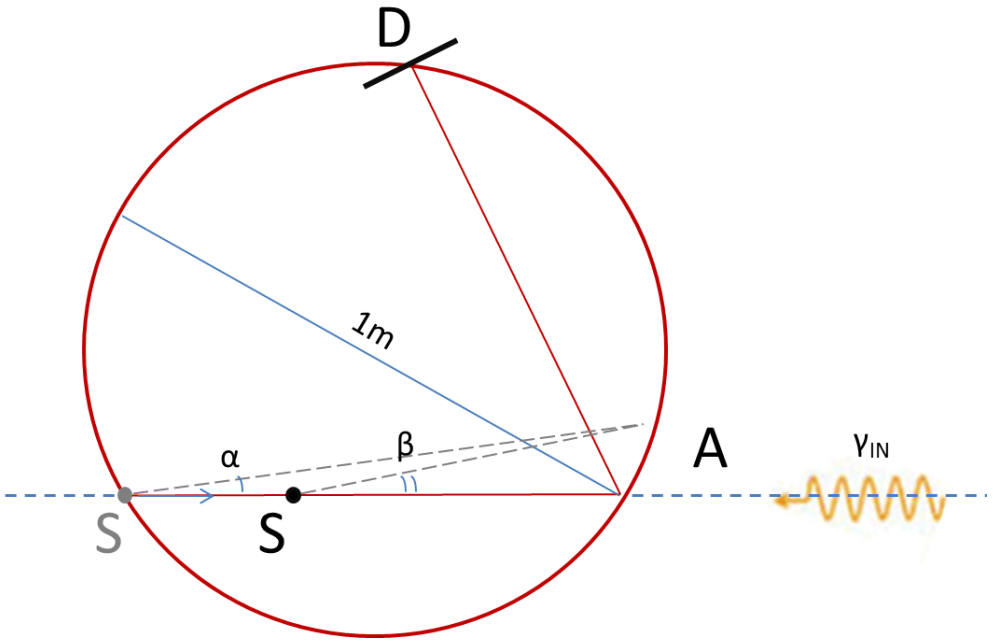
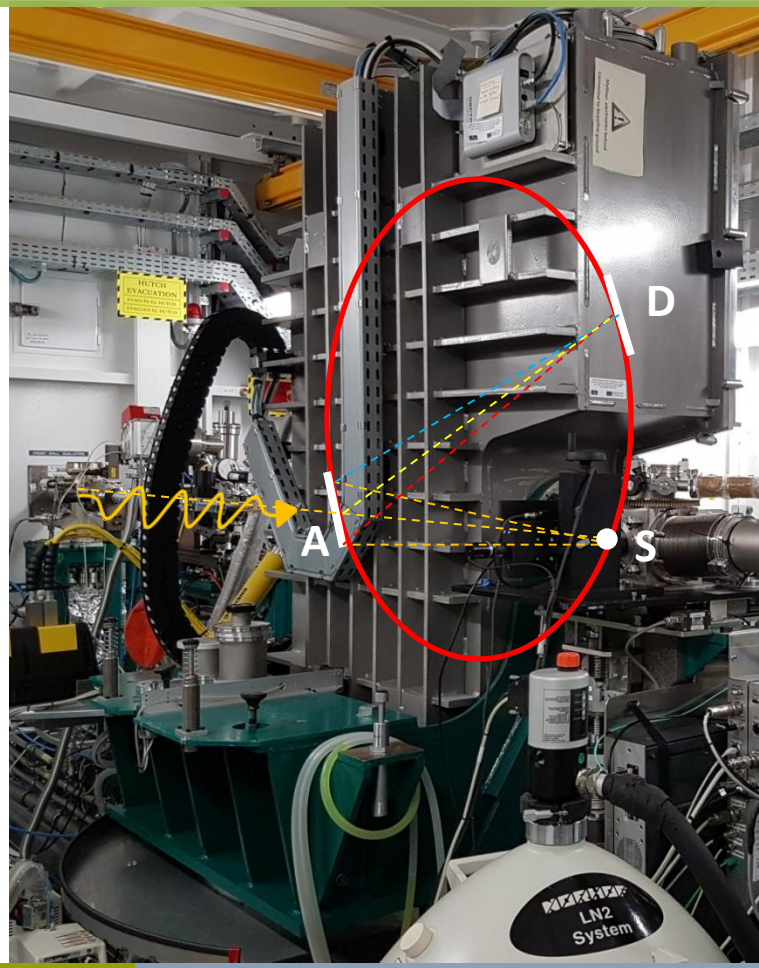
The CLEAR spectrometer:

- Energy dispersion: off Rowland geometry (spectra acquisition in a single shot)





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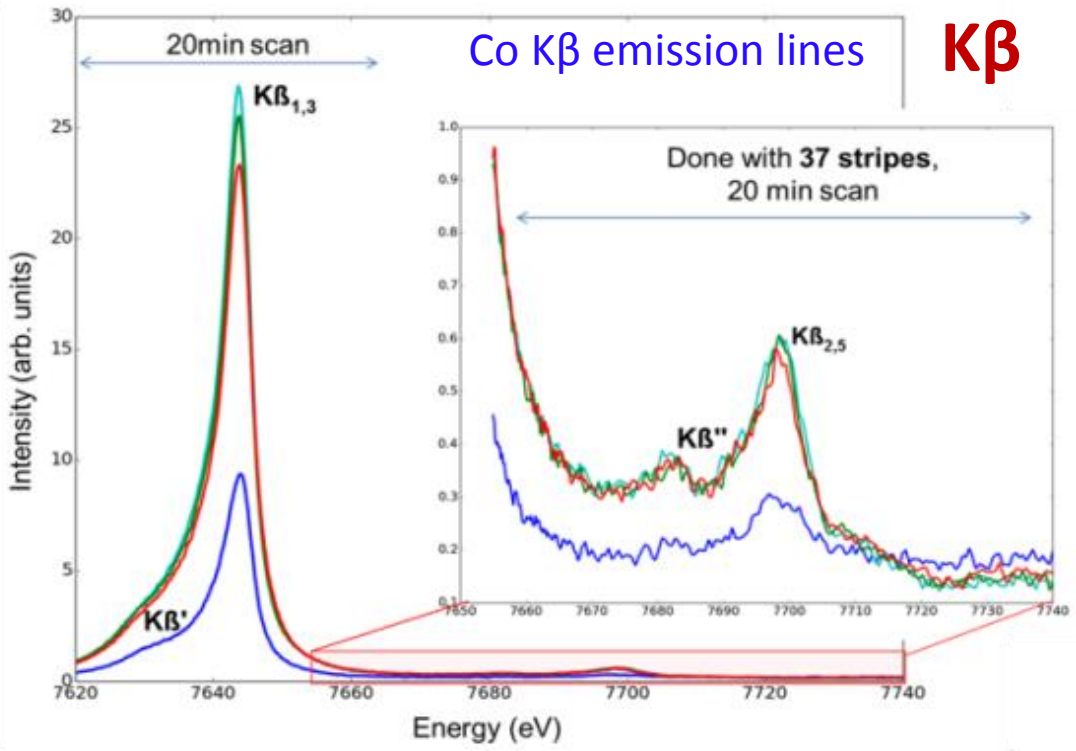
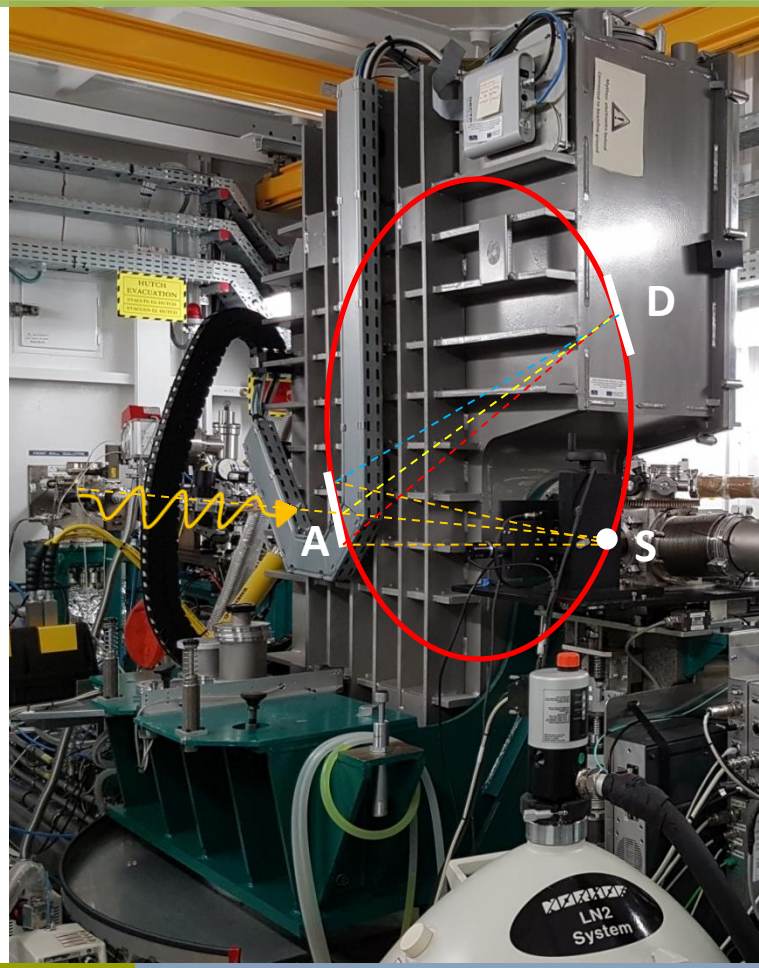
The CLEAR spectrometer:

- Spectra and acquisition time





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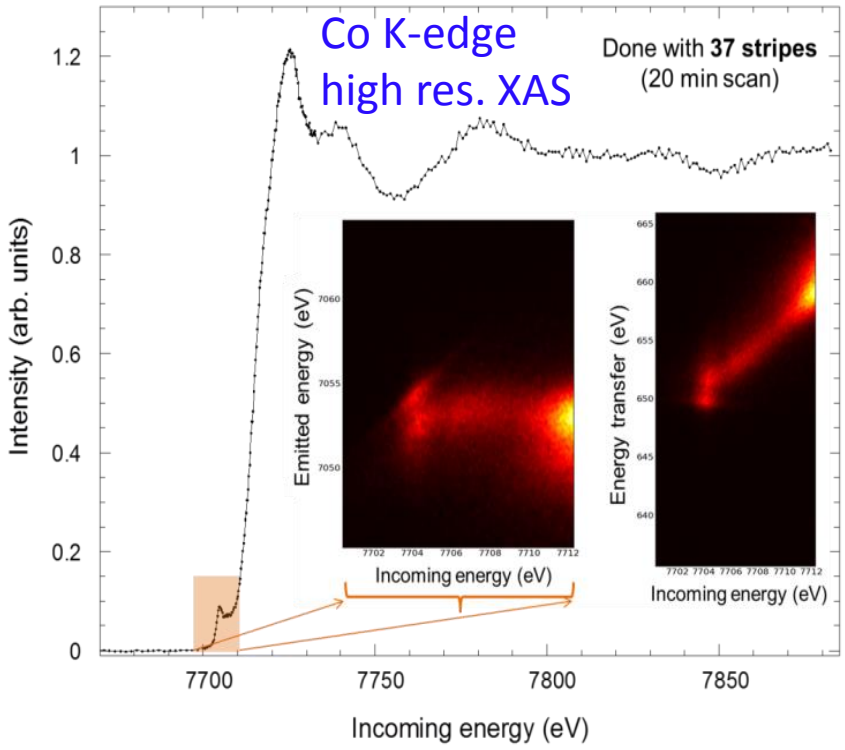
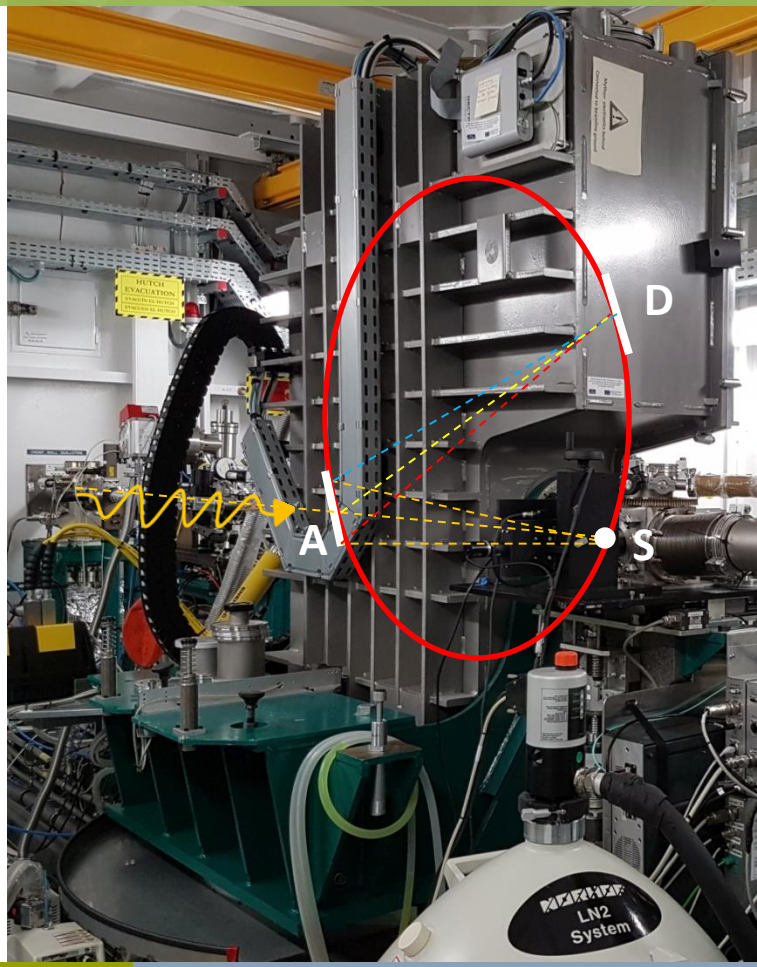


PFY

RXES



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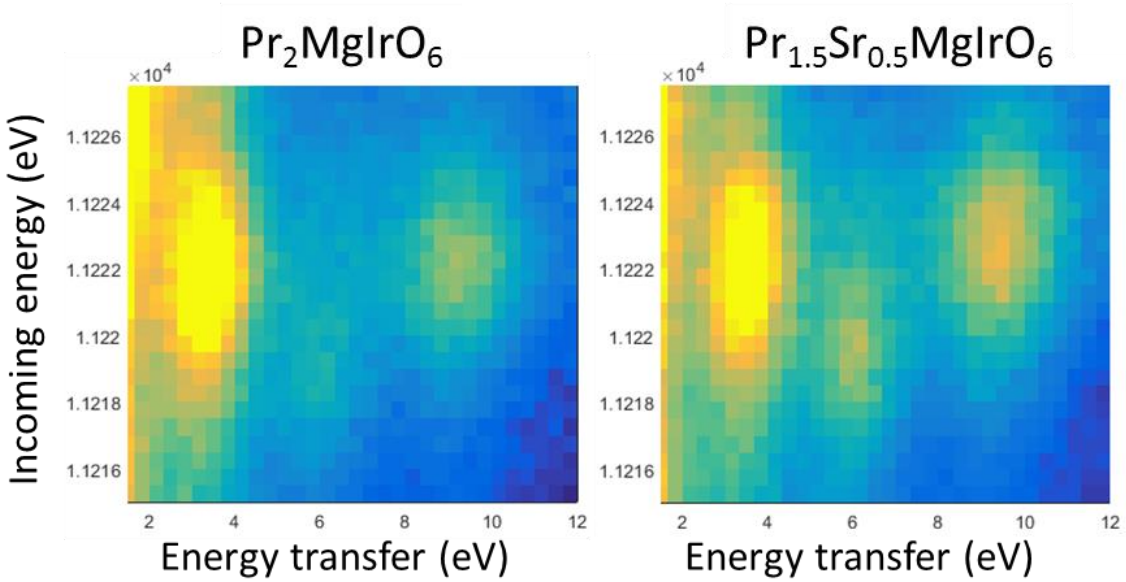
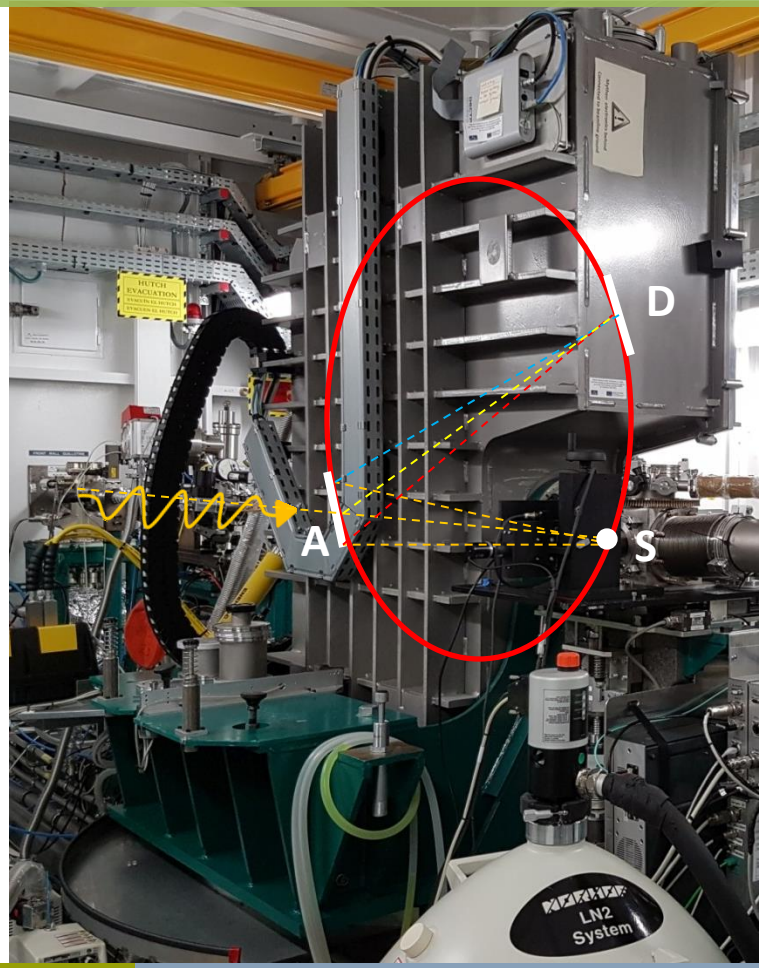
The CLEAR spectrometer:

- Spectra and acquisition time

Ir L_3-edge RIXS: **4.5h** ($\Delta E_{IN} = \Delta E_{OUT} = 0.33$ eV) **RIXS**



E_{res} ~ 1eV; E_{disp} ~ 20eV



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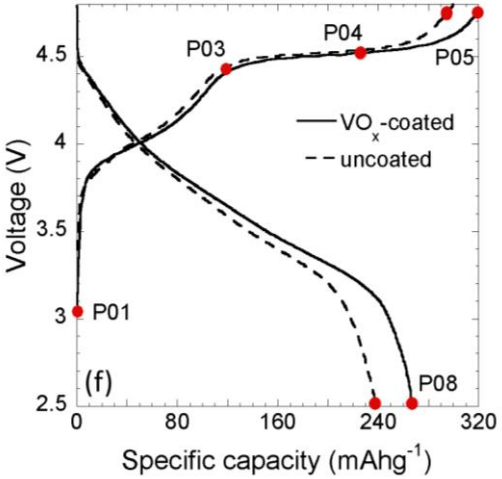
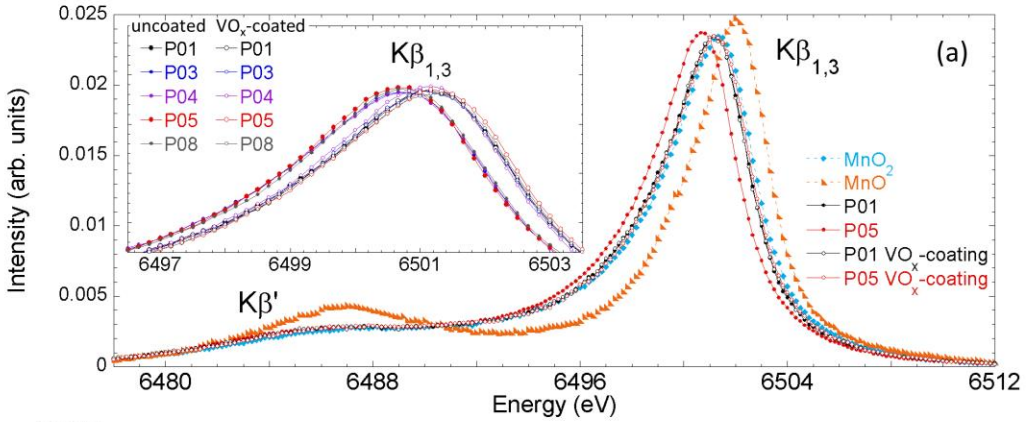
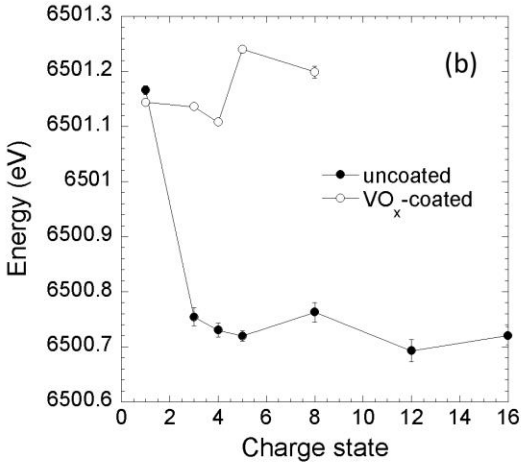
The CLEAR spectrometer:

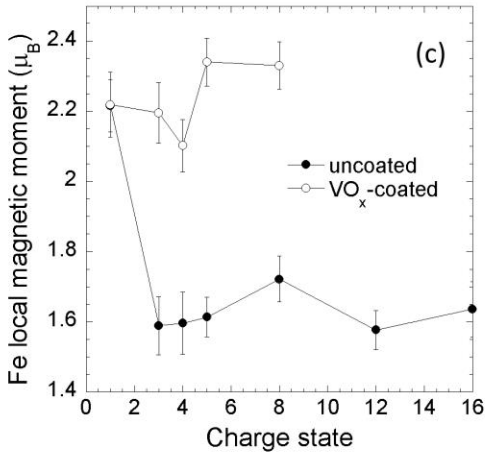
- Some scientific results:
  The role of manganese in Li- and Mn-rich $Li_{1+x}(Ni, Mn, Co)O_2$ cathodes

L. Simonelli et al., submitted









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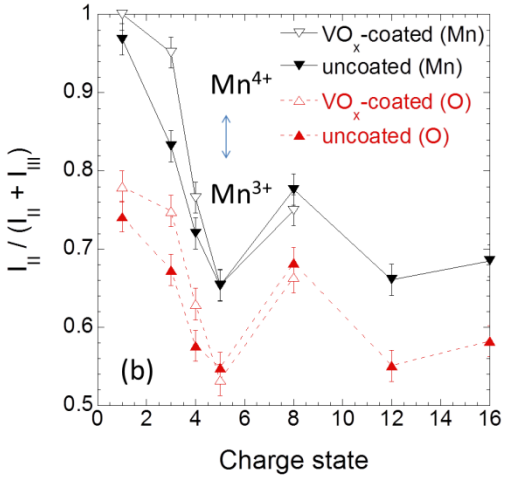
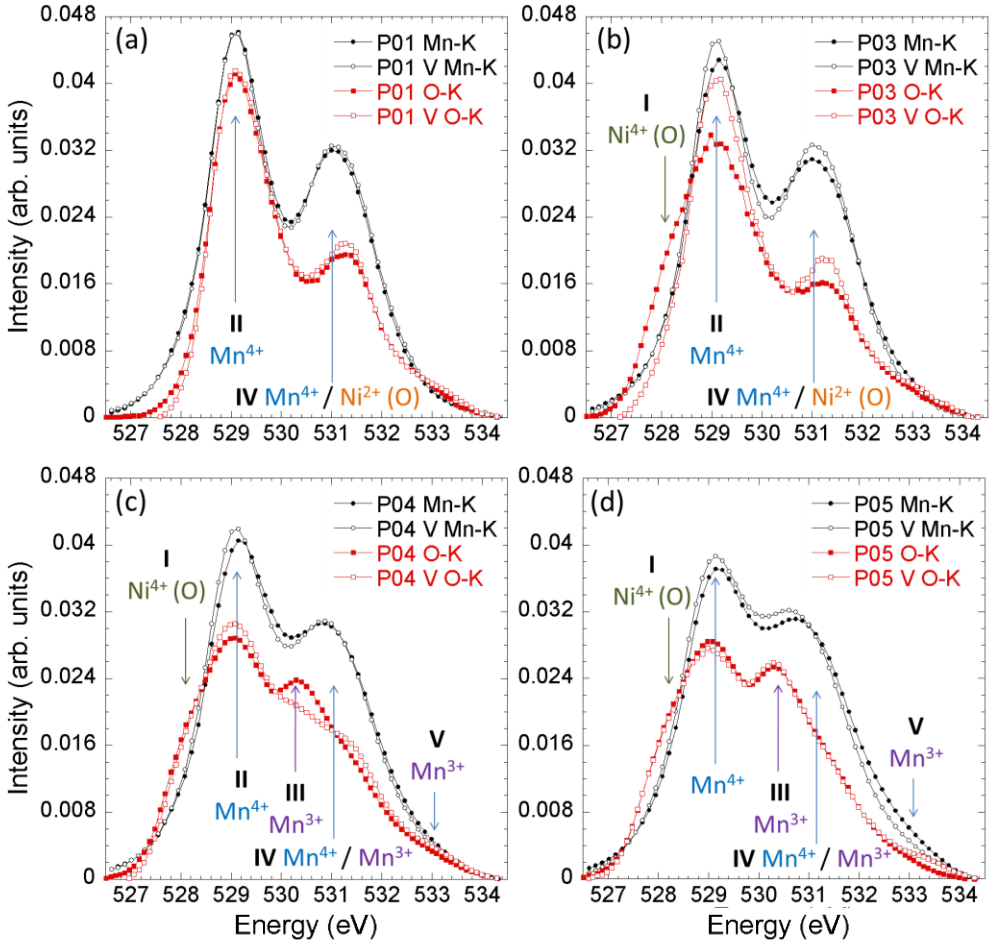




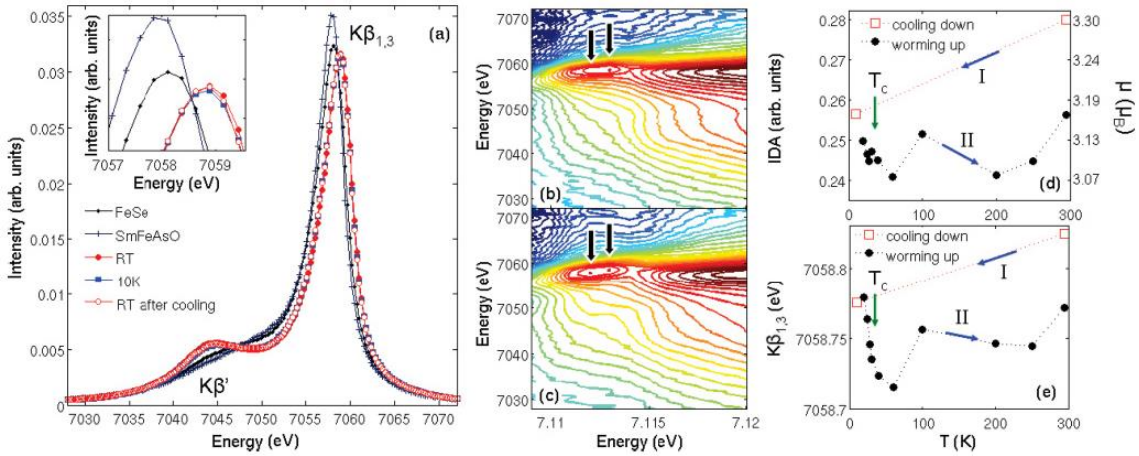
A new x-ray emission spectrometer is available at the CLÆSS beamline of ALBA

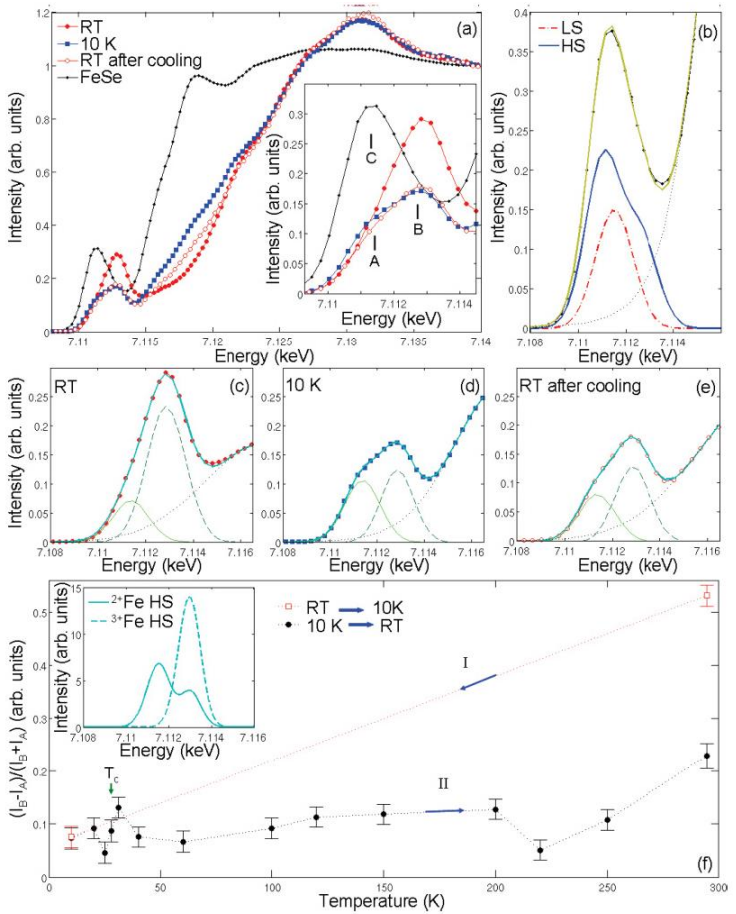
From previous works:

- Some scientific results:

$K_{0.8}Fe_2Se_2$ high T_c superconductor

L. Simonelli et al., PRB **85**, 224510 (2012)





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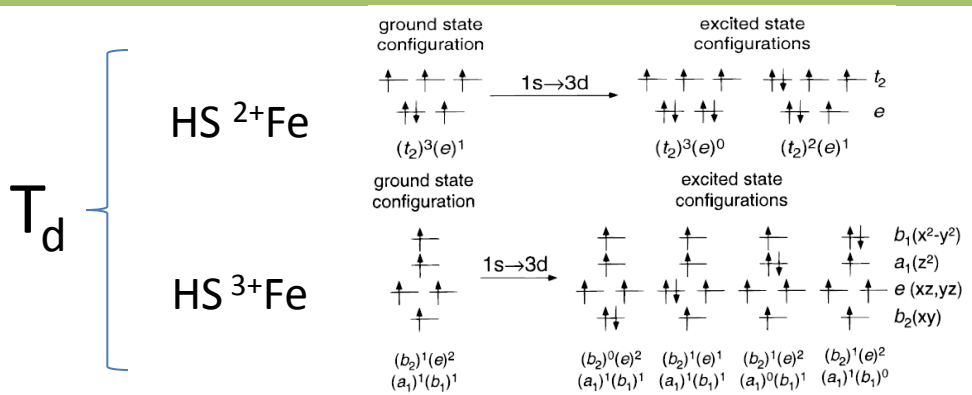
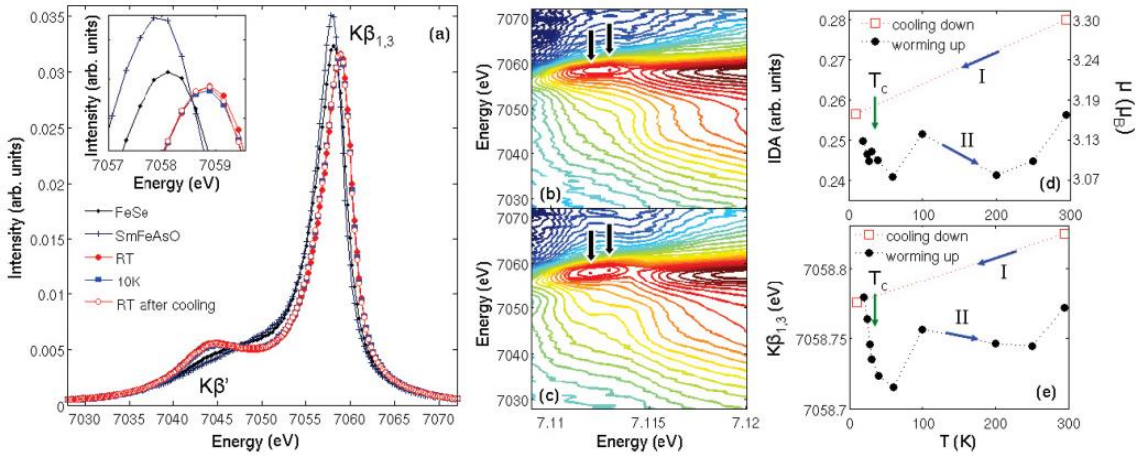
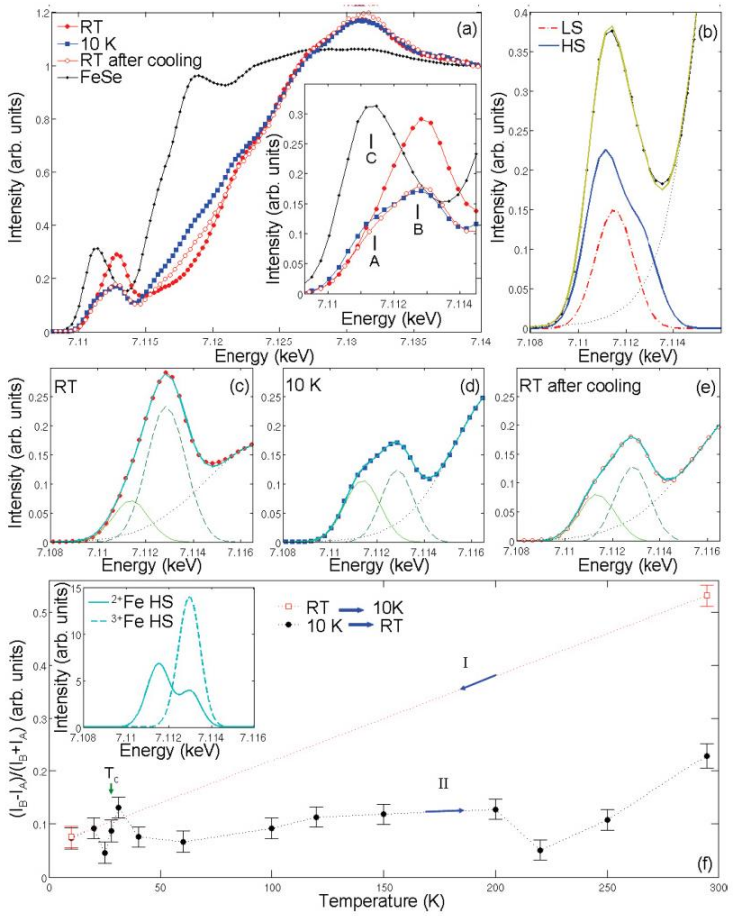


T. E. Westre et al., J. Am. Chem. Soc., Vol. 119, No. 27, 1997





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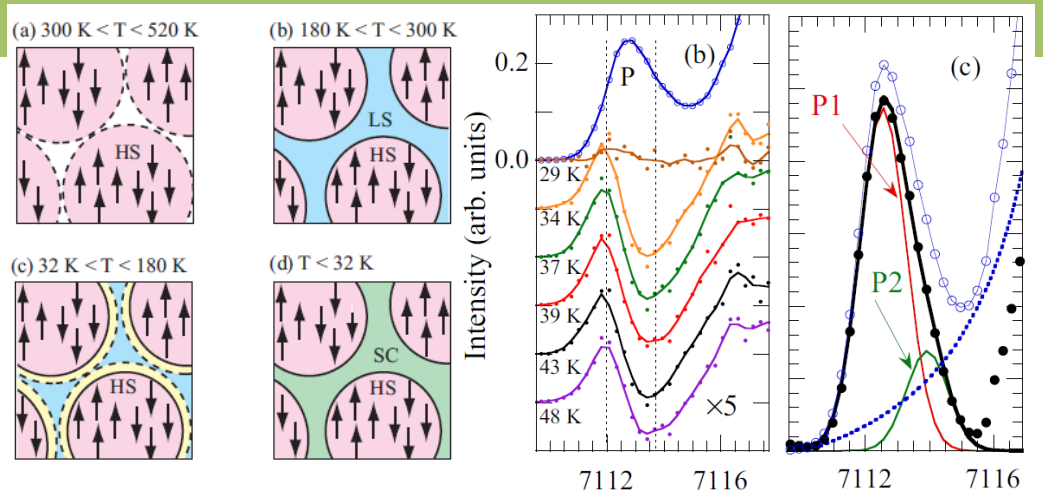
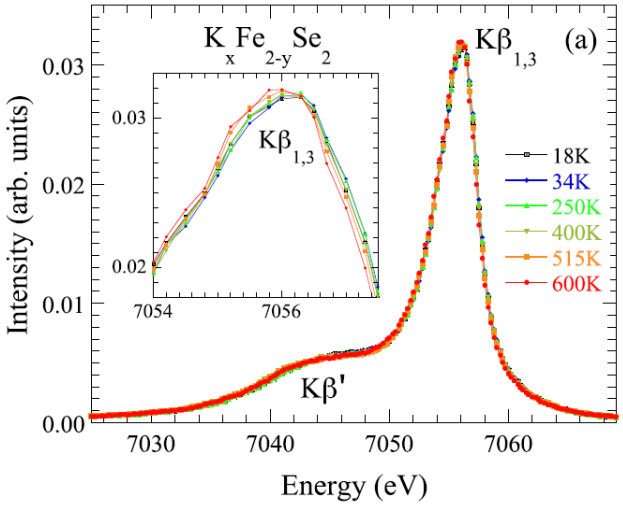
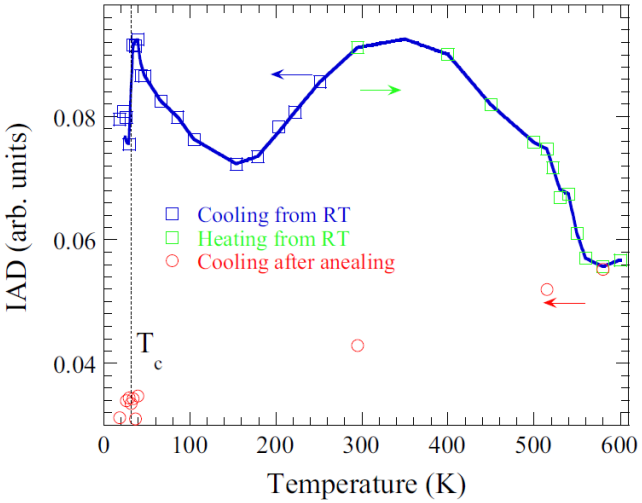
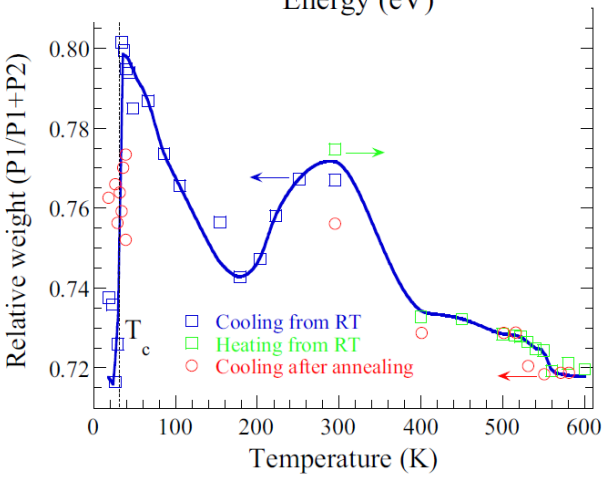
*L. Simonelli et al., PRB **90**, 214516 (2014)*









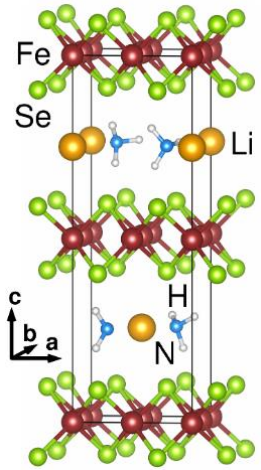
A new x-ray emission spectrometer is available at the CLÆSS beamline of ALBA

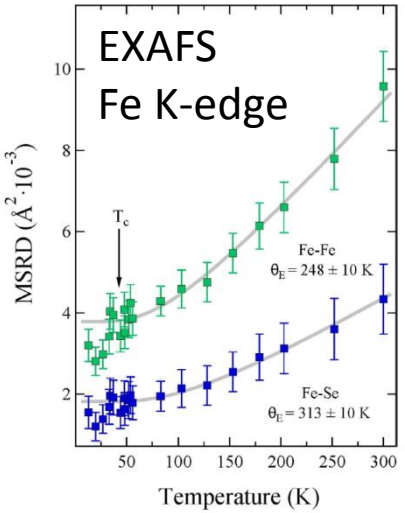
The CLEAR spectrometer:

- Some scientific results:

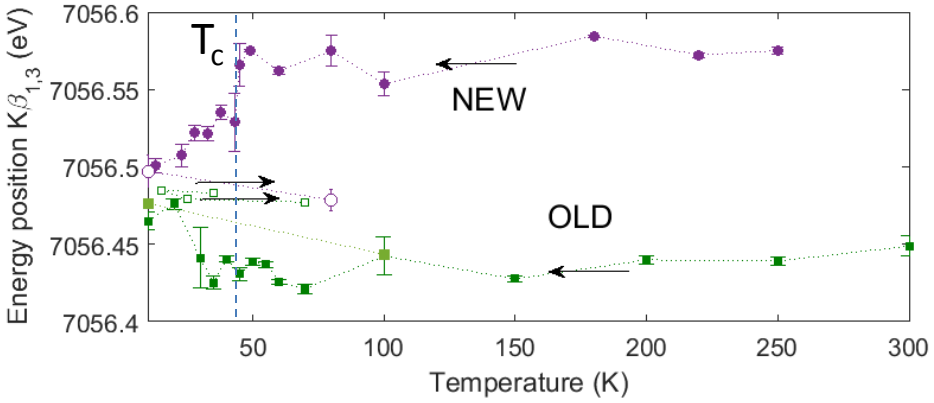
$Li(NH_3)Fe_2Se_2$ high T_c superconductor

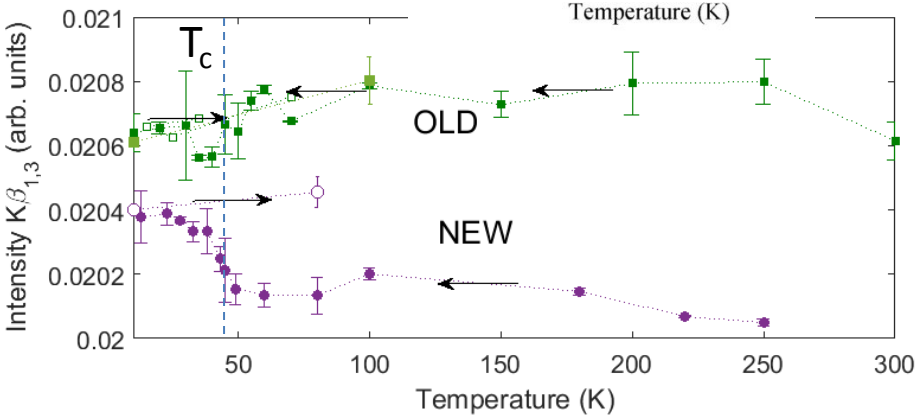
L. Simonelli et al., In preparation





Fe $K\beta_{1,3}$ emission line





A new x-ray emission spectrometer is available at the CLÆSS beamline of ALBA

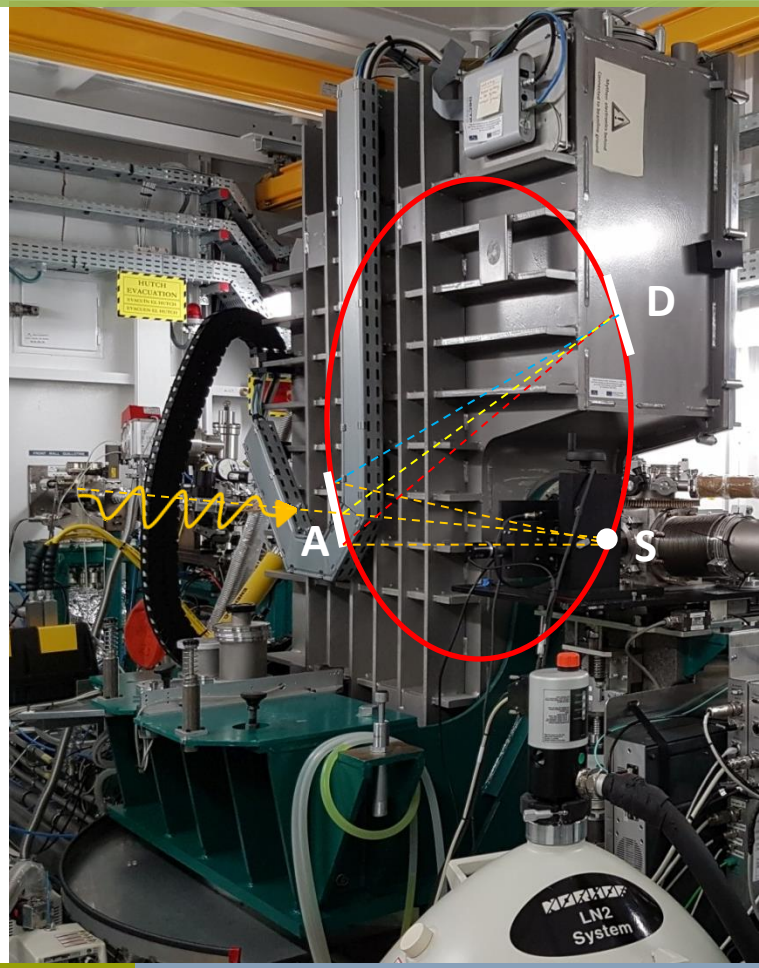
The CLEAR spectrometer:

+ Unique extreme back and forward scattering geometry

+ Flexibility (continue easy energy change by keeping good resolution)

+ Emission spectra in 1 shot (by exploiting simultaneously a diced analyzer and a 1D detector)

- Relatively low photon flux (diced respect bent analyzers) balanced by the CLÆSS 10^{13} ph/s



Acknowledgments

A. Sorrentino[a], Angelo Mullaliu[d], A. Birrozzi[c], N. Laszczynski[c], W. Olszewski[a,e], C. Marini[a], N. Ramanan[a], D. Heinis[a], S. Passerini[b,c], M. Giorgetti[d], and D. Tonti[f]

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[e] *Faculty of Physics, University of Bialystok, 1L K. Ciolkowskiego Str., 15-245 Bialystok, Poland*
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Thank you for your attention!