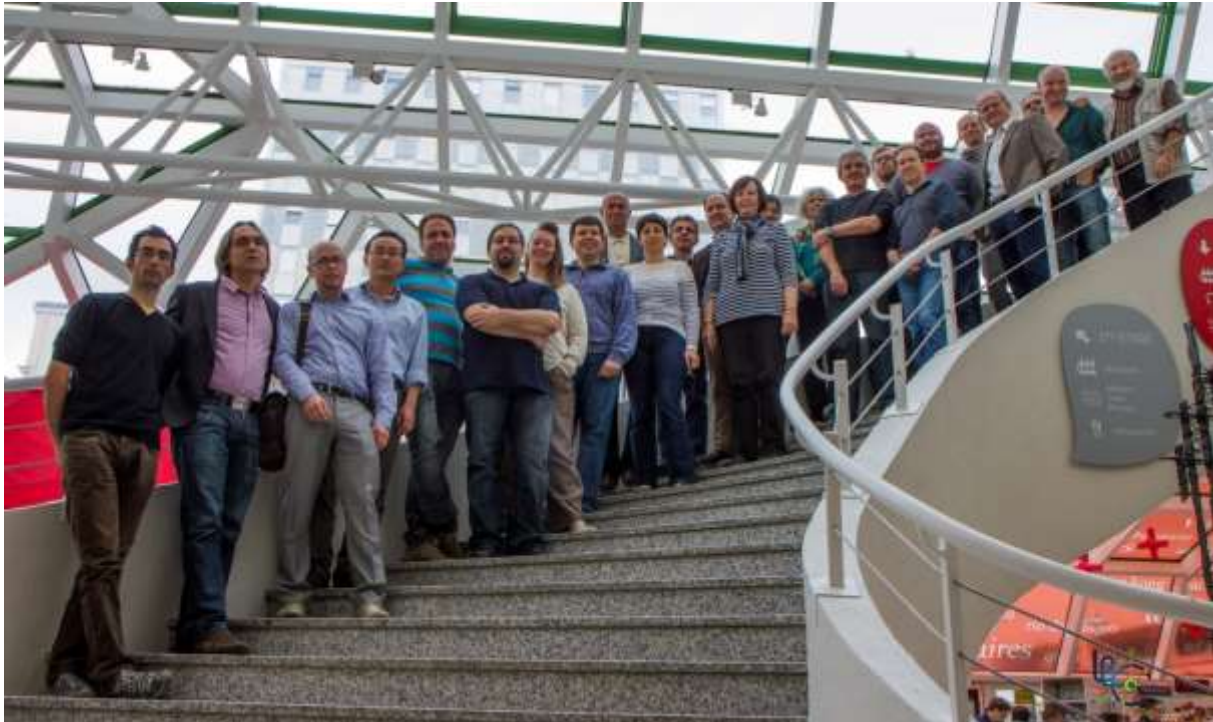


## International workshop "Magnetism single crystal diffractometer at the ESS ", May 26-27th 2014, FIAP Jean Monnet, Paris.

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International Workshop " Magnetism single crystal diffractometer (MSCD) at the ESS " took place in Paris at the FIAP on May 26-27th 2014. It was organized by the Laboratoire Léon Brillouin and joined neutron experts and users of in order to evaluate the perspectives of single crystal diffraction at the ESS and uncover the most important scientific community needs in this field. LLB intends to propose the construction of a single crystal diffractometer dedicated to Magnetism at the ESS (Sweden) as an in-kind French contribution.

The meeting focused on recent results obtained by Single Crystal Neutron Diffraction (SCND) in the studies of multiferroics, frustrated and low-dimensional magnetic systems, molecular magnetism and new instrumental developments using polarized neutrons. 27 participants from the main European neutron centers attended the conference.

The workshop was opened by a presentation of the French in-kind contribution to ESS by C. Alba-Simionesco (LLB), demonstrating the strong engagement of French neutron community in various ESS instrumentation projects including reflectometry, small angle scattering, inelastic scattering, sample environment and diffraction. This was followed by K. Andersen (ESS), recalling the essential features of the ESS long pulse neutron source, describing the status of projects submitted or under development and giving practical advices on the submission of further proposals.

The afternoon session began with J. Campo presenting polarized neutron diffraction experiments in molecular based magnets (a sulphur based radical family and "single molecule magnets"). Next D.

Luneau demonstrated how polarized neutrons can give informations about the local magnetic anisotropy in molecular systems containing metal complexes. A. Sazonov reported on recent polarized and unpolarized neutron diffraction experiments on the spin liquid and spin ice pyrochlores and T. Fennell illustrated the importance of polarization analysis in the diffuse scattering studies of pyrochlores.

M. Braden presented recent results on the control of multiferroic domains, which is a central issue for potential applications. He stressed that the analysis of the polarization matrix gives direct access to the domain chirality, which is essential in Dzyaloshinski-Moria type multiferroics.

Finally, recent neutron diffraction studies of exotic magnetic structures were reported by O. Petrenko (honeycomb systems), O. Zaharko (spin  $\frac{1}{2}$  ferromagnetic chains) and K. Prokes (“(3+1)D” antiferromagnetism in CeRuSn). In the last case it was pointed out that polarized neutron experiments were required to prove the existence of incommensurate charge ordering in this compound.

The second day of the workshop was dedicated to the instrumentation aspects of single crystal diffraction. Y. Su reported on upgrades of the DNS diffuse scattering instrument with XYZ polarization analysis (JCNS) and illustrated its performance by some recent highlights, like a Higgs phase transition in quantum spin ice. V. Hutanu demonstrated the possibilities of the (Poli) Heidi diffractometer (FRMII) in the investigation of melilites by use of neutron polarimetry. E. Babcock gave information on important progress in the construction of  $^3\text{He}$  neutron polarizers and wide- angle analyzers.

G. Iles presented the status of FALCON Laue diffractometer at HZB and J. Rodrigues-Carvajal presented “ESMERALDA”, new software for Laue data treatment. Finally, A. Bataille gave several examples of diffraction on nano-metric epitaxial single crystals on 6T2 diffractometer (LLB).

In the last session of the workshop two projects of magnetism diffractometer for ESS were presented; a cold diffractometer with XYZ polarization analysis (W. Schweika, ESS) and a thermal one with polarized incident beam optimized for spin density studies (X. Fabrèges and A. Gukasov, LLB). After the presentations a lively discussion took place, which can be shortly resumed as follows.

The scientific presentations of the first day have shown that single crystal diffraction has a great potential at the ESS. Its science case can include not only the subjects discussed during the workshop, like molecular and frustrated magnetism, charge order, quantum criticality and multiferroics but also superconductivity, phase transitions, GMR/manganites, skyrmions, real-time in-situ studies and so on.

Concerning the two ESS projects in preparation, it appears mandatory to join both projects in a single one in order to make a unique proposal for a polarized single crystal diffraction instrument. This proposal must include polarization analysis covering both thermal and cold neutron wavelength regions.

Arsen Gukasov,

**Further information about the workshop can be found on the workshop Website**  
[http://www-llb.cea.fr/Phoce/Vie\\_des\\_labos/Seminaires/index.php?id=2941](http://www-llb.cea.fr/Phoce/Vie_des_labos/Seminaires/index.php?id=2941)