



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 2736

Type: **Invited Speaker** / Conférencier(ère) invité(e)

Muon as a unique probe in condensed matter physics

Wednesday 5 June 2019 14:00 (30 minutes)

Muon is an elementary particle with spin $\frac{1}{2}$, capable to measure the local magnetic field inside the matter either internal origin (magnetism) or externally applied (field exclusion due to the superconductivity). This characterizes the muon particle, or the measurement scheme known as **muon spin rotation/relaxation/resonance (μ SR)** as the most sensitive probe of magnetism and superconductivity [1,2].

Another important aspect of μ SR is the characteristic of the muon as a radio active isotope of a proton: the implanted muon takes the same position and the charge state of a hypothetical Hydrogen in the matter, and the hyperfine coupling parameter to the electron spin systems may be evaluated through the time evolution of the muon spin. This provides a valuable information about an isolated Hydrogen in semiconductors [1,2] and Hydrogen radicals in chemical reactions [1,3].

The μ SR is a unique probe in condensed matter physics, and is available in research proposal basis to Canadian and International users at TRIUMF in the UBC campus. In the presentation, the author will introduce recent research activities and invite new users to the facility.

Reference

- [1] for recent research activities, please refer to proceedings of international conference of muon spin rotation/relaxation/resonance, muSR2017 (Sapporo), 2014 (Grindelwald), 2011 (Cancun) etc.
- [2] for example, M. Hiraishi *et al.*, *Nat. Phys.* **10**, 300 (2014).
- [3] for example, K. Shimomura *et al.* *Phys. Rev. B* **92**, 075203 (2015).
- [4] for example, S. Ito *et al.* *Angew. Chem. Int. Ed.*, **57**, 8608 (2018).

Author: Dr KOJIMA, Kenji (Centre for Molecular and Materials Science)

Presenter: Dr KOJIMA, Kenji (Centre for Molecular and Materials Science)

Session Classification: W2-6 Local probes (DCMMP) | Sondes locales (DPMCM)

Track Classification: Condensed Matter and Materials Physics / Physique de la matière condensée et matériaux (DCMMP-DPMCM)