

# 15th International Conference on Muon Spin Rotation, Relaxation and Resonance



Contribution ID: 223 Contribution code: IV-0

Type: Oral

## Yamazaki Prize Lecture - The quantum muon

*Monday, 29 August 2022 09:40 (40 minutes)*

The key physical process at the heart of the muon-spin rotation ( $\mu$ SR) technique is that the spin of the positive muon precesses in a local magnetic field, a process that can be modelled either classically (torque on a magnetic dipole) or quantum mechanically (interference between components in a superposition). However, some aspects of the muon's interaction with its environment bring out features which are purely quantum mechanical and have no classical analogue. Understanding this requires an accurate modelling of the muon site, only possible with modern electronic structure (DFT+ $\mu$ ) methods. I will review a variety of examples of muon experiments on organic, molecular and inorganic systems which will highlight some important qualities of this viewpoint and demonstrate the utility of "the quantum muon".

(Yamazaki lecture)

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**Session Classification:** Invited Talks

**Track Classification:** Spin liquids and related phenomena