MuSR2020 Science Day

Monday December 13th – Tuesday December 14th, 2021

Venue: Zoom, Timing UK (GMT)

(Speakers should allow time for discussion within their allotted time)

Monday 13th December 2021

15:00 **Welcome**
Adrian Hillier/Roberto De Renzi (MuSR2020, conference chairs)

15:10 **Understanding defects in SiC using low-energy muons**
Judith Wörle, ETH Zurich, Switzerland

> Inspired from **Interaction of low-energy muons with defect profiles in proton-irradiated Si and 4H-SiC**, Phys. Rev. B **100** 115202 (2019) https://doi.org/10.1103/PhysRevB.100.115202, and **Low-energy muons as a tool for a depth-resolved analysis of the SiO2/4H-SiC interface**, Materials Science forum, **1004**, 581, 2020 https://www.scientific.net/MSF.1004.581

15:40 **Understanding ancient manufacturing techniques and economic crisis through µXES analyses of Roman Gold Coins**
George Green, Ashmolean Museum and Oxford University, UK

> Inspired from **Understanding Roman Gold Coinage Inside Out,** Journal of Archaeologic Science, **134**, 105470 (2021) https://www.sciencedirect.com/science/article/abs/pii/S0305440321001400

16:10 ***Break*** *(15 mins)*

16:25 **Discovery of Hidden Charge Neutral Centers in Magnetic Materials: Implications and Applications**
Martin Dehn, University of British Columbia, Canada

> Inspired from **Muon-Polaron Complexes in Fe2O3**, Phys. Rev. Lett **126**, 037202, 2021 https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.126.037202

16:55 **Hydrogen Atoms and Free Radicals in Clathrate Hydrates studied by Muon Spin Spectroscopy**
Paul Percival, Simon Fraser University, Canada

> Inspired from **Investigation of H atom and free radical behaviour in clathrate hydrates of organic molecules**, Radiation Physics and Chemistry, **168**, 108532, 2020 https://www.sciencedirect.com/science/article/abs/pii/S0969806X19310850

17:25 **Unconventional superconductivity in Sr2RuO4: µSR experiments under strain, hydrostatic pressure and effect of disorder**
Vadim Grinenko, Dresden, Germany

> Inspired from **Unsplit superconducting and time reversal symmetry breaking transitions in Sr2RuO4 under hydrostatic pressure and disorder**, Nature Communications 2021, https://www.nature.com/articles/s41467-021-24176-8

Tuesday 14th December 2021

7:55 **Convene**

8:00 **Search for Time-Reversal Symmetry Breaking in Unconventional Superconductors**
Ravi Singh, IISER Bhopal, India

> Inspired from **Unconventional superconductivity in Non-centrosymmetric superconductors** (https://journals.aps.org/prb/abstract/10.1103/PhysRevB.103.174502, https://journals.aps.org/prb/abstract/10.1103/PhysRevB.103.054501 and https://iopscience.iop.org/article/10.1088/1361-6668/abe4b7

8:30 **Applications of Muon in Cancer Research**
Amba Pant, KEK, Japan

> Inspired from **Muonium response to low oxygen levels in haemoglobin and other biological aqueous solutions and potential application towards monitoring hypoxia** Nucl. Instrum. Methods Phys. Res., Sect. A, **1011**, 165561 (2021) https://www.sciencedirect.com/science/article/pii/S0168900221005465

9:00 ***Break*** *(15 mins)*

9:15 **Nondestructive detection of metallic Li in a lithium-ion battery with muonic x-rays**
Izumi Umegaki, KEK, Japan

> Inspired from **Nondestructive High-Sensitivity Detections of Metallic Lithium Deposited on a Battery Anode Using Muonic X-rays**, Anal. Chem. **92** (2020) 8194-8200 https://pubs.acs.org/doi/10.1021/acs.analchem.0c00370

9:45 **Muon spectroscopy for operando measurements of lithium diffusion**
Innes McClelland, Sheffield/ISIS, UK

> Inspired from **In Situ Diffusion Measurements of a NASICON-Structured All-Solid-State Battery Using Muon Spin Relaxation**, ACS Appl Energy Mater. 2021 Feb 22; 4(2):1527-1536 https://pubs.acs.org/doi/10.1021/acsaem.0c02722

10:15 ***Close***