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Upgrades to the VITO beamline to study solid-state battery materials

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All-solid-state batteries (SSBs) present a potential route to address the poor range, slow charge, small temperature range of operation, and safety issues associated with traditional lithium-ion batteries.[1] However, one of the major limitations preventing SSBs to commercial market is the poor ionic conductivity of SSB materials, determined mostly by ion diffusion. Unlike other techniques to study these materials, such as impedance spectroscopy, pulsed-field gradient resonance (PFG-NMR), and NMR relaxometry, β-NMR can monitor ion dynamics at the interfaces, which is where the lower limit for diffusion expected to arise.[2–4]

This poster presents the proposed experiments using the VITO beamline for an exploratory study of $^{8}Li^{+}$ diffusion across the anode and electrolyte interface of three SSB materials. These experiments aim to utilise the correlation between relaxation and diffusion in solid state materials, in addition to the well-known characteristics of ^{8}Li β-decay asymmetry.

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Authors: SPARKS, Amy; Dr REES, Gregory (Department of Materials, University of Oxford); KOWALSKA, Magdalena (CERN); BISSELL, Mark (CERN); AZARYAN, Nikolay (Adam Mickiewicz University (PL)); COLLABORATION, VITO (CERN)

Presenter: SPARKS, Amy

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