Contribution ID: **159** Contribution code: **P-TUE-7** Type: **Poster**

μSR studies of dynamics in model biomembranes

Tuesday, 30 August 2022 18:40 (20 minutes)

Avoided level crossing muon spin resonance (ALC-μSR) has been used to study the dynamics of the alkyl chains and cholesterol within model biomembranes composed of phospholipids (DPPC and POPC) and cholesterol. ALC-μSR is sensitive to motions on timescales between that measurable by NMR and neutron scattering. Muonium adds to the unsaturated C=C bonds of POPC and cholesterol to give in situ spin probes. The muon and methylene proton hyperfine coupling constants (hfccs) were determined from the Δ_1 and Δ_0 resonance fields in the ALC-μSR spectra. The dipolar muon hfccs ($D_\mu^\parallel$) and the electron spin flip rates were determined by modelling the Δ_1 and Δ_0 resonance lineshapes using Monte Carlo simulations. These parameters provide information about the motion of the spin probes in the alkyl chains. In all cases, the spin probes are undergoing restricted reorientational motion, but the addition of cholesterol leads to more restricted motion of the alkyl chains, evident from the larger $D_\mu^\parallel$, and tighter packing of the chains, which is deduced from the magnitude of the muon hfccs. The goal of this project is to determine how the dynamics at different positions within the biomembrane depend on the composition.

Primary author: MCKENZIE, Iain (TRIUMF)

Co-authors: Mr DI PASQUALE, Mitchell (University of Windsor); Mr ELNATOUR, Chafic (TRIUMF); Mr MULLEY, Brian P. (University of Waterloo); Dr SCHEUERMANN, Robert (Laboratory for Muon Spin Spectroscopy, Paul Scherrer Institut, CH-5232 Villigen PSI, Switzerland); Prof. MARQUARDT, Drew (University of Windsor)

Presenter: MCKENZIE, Iain (TRIUMF)

Session Classification: Posters

Track Classification: Molecular chemistry and chemical physics