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BetaNMR Experiments on Liquid Samples A. GOTTBERG, M. STACHURA, TRIUMF, Canada, L. HEMMINGSEN, University of Copenhagen, Denmark, W.A. MACFARLANE, University of British Columbia, Canada, BIO-BETA-NMR COLLABORATION, COLLAPS COLLABORATION — In 2012 betaNMR spectroscopy was successfully applied on liquid samples; an achievement which opens new opportunities in the fields of chemistry and biochemistry. This project was motivated by the need for finding a new experimental approach to directly study biologically highly relevant metal ions, such as Mg(II), Cu(I), Ca(II), and Zn(II), which are silent in most spectroscopic techniques. The resonance spectrum recorded for Mg-31 implanted into an ionic liquid sample showed two resonances which originate from Mg ions occupying two different coordination geometries, illustrating that this technique can discriminate between different structures. This proof-of-principle result lays the foundation for studies of these metal ions at low concentrations and in environments of biological relevance where other methods are silent. The prototype chamber for bio-betaNMR allows for experiments not only on different samples such as: liquids, gels and solids, but also operates at different vacuum environments. In order to exploit the potential of betaNMR on liquid samples, tests with polarized beams of Mg-29 and Mg-31 have recently been performed at the ISAC facility at TRIUMF.

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