



Contribution ID: 38

Type: Poster

## Technical developments and first studies of biological samples at the VITO beamline.

*Wednesday 5 December 2018 17:30 (2 hours)*

In December 2017 we recorded the first beta-NMR signals of  $^{26}\text{Na}$  in liquid samples [Kow18] using the Bio Beta-NMR setup at the VITO beamline [Kow17, Gin18]. 2018 has seen many beamline upgrades including a new charge exchange cell [Gin18], a home-build vacuum-compatible NMR magnetometer, a new magnet giving better homogeneity and higher field strength, a new measurement chamber and a temporal magnetic field stabilization system. With these upgrades we are pleased to report the first beta detected NMR signals from biological samples, recorded in May 2018 and to-be measured in October 2018.

Our biological samples are Guanine Quadruplexes (G-Quadruplexes), which are special four strand DNA conformations. G-quadruplexes can be formed in Guanine rich DNA sections in the presence of sodium and/or potassium cations. These DNA structures are found at the end of chromosomes (telomeric regions) and influences the behavior of the telomerase protein. Telomerase malfunctioning has been linked to effects of aging and cancer.

[Kow17] M. Kowalska et al., J. Phys. G: Nucl. Part. Phys. 44 (2017) 084005

[Kow18] M. Kowalska et al., CERN-INTC-2018-019 / INTC-P-521-ADD-1 (2018)

[Gin18] W. Gins et al., submitted to Nucl. Instr. and Meth. B (2018), arXiv:1809.04385

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**Session Classification:** Poster Session