

Beta Detected NMR: a New Probe for Nanoscience

TRIUMF's ISAC facility in Vancouver, Canada produces intense beams of short-lived radioactive ions for research in nuclear and materials science. The latter uses ${}^8\text{Li}^+$ as an implanted spin-polarized radioactive probe. Using the technique of beta-detected Nuclear Magnetic Resonance, local magnetic information is extracted via detection based on the asymmetric property of nuclear beta-decay. The probe ion implantation energy can be varied from ~ 30 keV down to ~ 100 eV, allowing the implantation depth to be varied from a few hundred nanometers down to a few nanometers. Thus depth-resolved measurements of thin films, heterostructures and near-surface and buried-interface effects can be performed on a wide range of condensed matter systems. This capability is similar to that of Low Energy Muons, but the ${}^8\text{Li}$ probe is substantially different, for example its lifetime is a factor of 10^6 longer, making it sensitive to different phenomena. The facility and some recent examples will be reviewed.

Assistant Prof W Andrew MacFarlane

Chemistry, University of British Columbia, Canada