

Item 12; Section C: FORM D: Application for Grant under Emeritus Scientist Scheme of CSIR

SUMMARY of Proposed Research: Dr.S.Aravamudhan, N.E.H.U.

The work reported(1) in a NOTE during 1966 based on experiments using Varian A60 NMR Spectrometer seems to require a detailed reconsideration in view of the current spectrometer systems available for solids and liquids. The determination of susceptibility anisotropies using the bulk susceptibility effects in NMR chemical shifts is an important contribution of NMR techniques for Magnetic Susceptibility estimations in particular of transition-metal paramagnetic compounds. The situation of having to consider a Lorentz sphere for such demagnetization effects as that of bulk susceptibility in a medium is well established. And in the case of solids, recently (2), the characteristics of the induced fields within the Lorentz spherical volume elements and the necessity of spherical shapes for Lorentz volume element have been well discussed and since them molecules are held in fixed positions in solids the required hypothetical cavity can be easily realized by calculating induced fields within the cavity and taking into account this separately in the total contribution to fields at a site. However, since in liquids the fast tumbling motion and the resulting time dependences compound such estimates of induced fields within the Lorentz Volume element. And, it has been found that an **“interaction parameter”** plays a role (as reported in an early paper by W.C.Dickinson: ref. 3) which is not unambiguously explainable. This situation probably can be better clarified with the intended approaches in this project. All these efforts necessarily require improving the criterion for the validity of point dipole approximations for the various contexts of induced field estimates, thus paving the way for a better visualization of the origin of induced field distributions and demagnetization effects in particular for applications in chemistry. Also the biological applications using inner and outer compartmental regions in a specimen would get tangible approaches for reducing the complexities (4).

1. J.Q.Adams , Review of Scientific Instruments, Vol.37, page 1099 (1966)
2. http://nehuacin.tripod.com/pre_euromar_compilation/
3. http://www.geocities.com/inboxnehu_sa/Poster_Sheets_Ampere.html
4. http://www.geocities.com/inboxnehu_sa/nmrs2005_icmrbs.html