

GaP studies by RF- μ SR in Electric Fields

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We report combined RF- μ SR and electric fields (EF) measurements in semi-insulating GaP sample similar to one used in the transverse magnetic field (TF) EF- μ SR experiments [1]. At low temperatures ($T < 50$ K) the diamagnetic RF asymmetry was found to be significantly bigger than the TF asymmetry. This fact is an indication of delayed muonium to diamagnetic signal conversion. Electric field dependencies measured at $T = 20$ K revealed completely different behavior of RF (or final state) and TF (or shortly formed state) asymmetries. Contrary to usually observed scenario, electric field **prevents** the formation of the final diamagnetic state. At high temperatures (where both RF and TF diamagnetic asymmetries are small) electric field enhances both RF and TF diamagnetic asymmetries similar to the majority of electric field μ SR measurements. Possible explanation

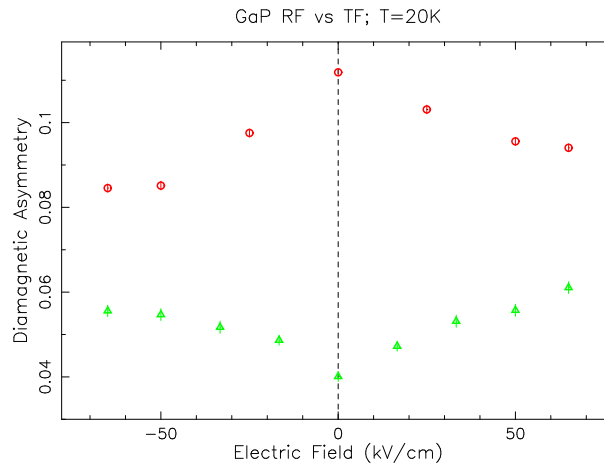


Fig. 1: Electric field dependencies of the diamagnetic RF asymmetry (circles) and TF diamagnetic asymmetry (triangles) measured at $T = 20$ K.

of the unusual low temperature observations can be delayed Mu to Mu^- or Mu to Mu^+ conversion. Electric field can heat the track products and increase the probability of the electron/hole capture by deep centers which are intentionally introduced in production of semi-insulating GaP. Further theoretical studies are needed.

[1] V.G. Storchak et al., Phys. Rev. B 67 (2003) 244.