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Memorandum

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Muon asymmetry A_μ as a function of HV settings, Run12 and Run2001

The muon asymmetry A_μ for Run12 and Run2001 was determined from the measurements on the thick Cu sample (Run12, 50G runs), the silver plated Al substrate and the s-Ne samples (Run2001, 100G). The s-Ne data from Run2001 show no evidence for Mu formation. Therefore, they can be chosen as well to measure A_μ in dependence on the HV transport settings of the LEM apparatus. The Cu and Ag data were fitted with a gaussian relaxation ($\sigma_{Cu} \approx 0.34\ \mu\mathrm{s}^{-1}$, $\sigma_{Ag} \approx 0.1\ \mu\mathrm{s}^{-1}$) whereas an exponential relaxation fits better to the s-Ne data ($\lambda \approx 0.05\ \mu\mathrm{s}^{-1}$). The damping in Cu

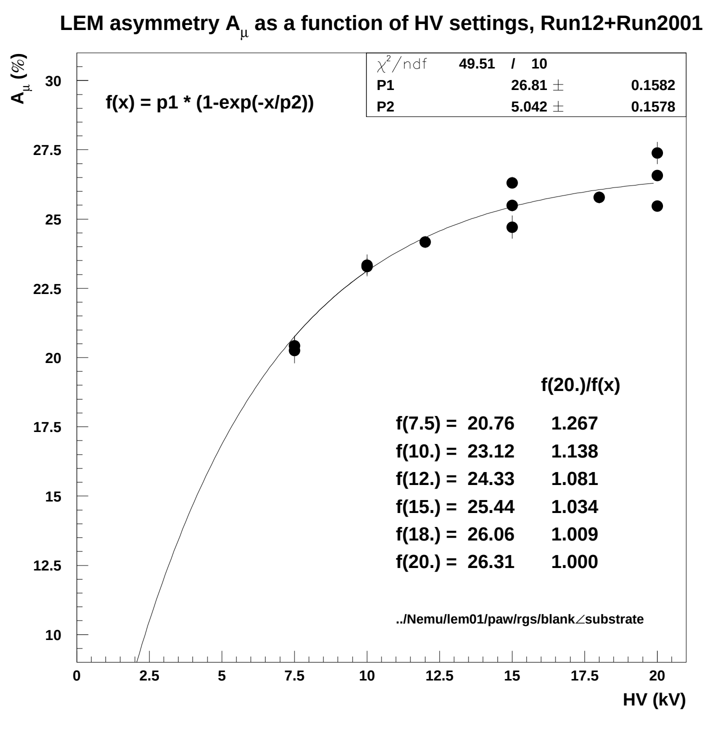

Figure 1: Muon asymmetry A_μ as a function of the HV settings of the LEM apparatus.

is due to the nuclear moments of ^{63}Cu and ^{65}Cu:

$$\mu(^{63}\mathrm{Cu}) = 2.23\ \mu_N \qquad \mu(^{65}\mathrm{Cu}) = 2.38\ \mu_N.$$

In Ag the two natural isotopes ^{107}Ag and ^{109}Ag have small nuclear moments:

$$\mu(^{107}\mathrm{Ag}) = -0.11\ \mu_N \qquad \mu(^{109}\mathrm{Ag}) = 0.13\ \mu_N,$$

that might lead to the observed relaxation. In Ne there is the isotope ^{21}Ne with $\mu(^{21}\mathrm{Ne}) = -0.66\ \mu_N$ that has an natural abundance of 0.3%, thus giving rise to ”dilute” dipoles causing a Lorentzian field distribution. The origin of the relaxation in Ag is not clear.