JOINT INSTITUTE FOR NUCLEAR RESEARCH LABORATORY OF NUCLEAR PROBLEMS

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ON THE ANGULAR DISTRIBUTION OF μ^{\dagger} MESONS

IN THE $(JI - \mu)$ DECAY

Объединенный институт вдерных неследовани БИБЛИОТЕКА

At the Varenna Conference (Italy 1957) some results on the angular distribution of μ^{t} in the $\pi^{-}\mu$ decay were presented by Lattes, and the possibility of any asymmetry in this angular distribution was discussed.

Further experiments [1-4] led for the asymmetry coefficient $b=2\frac{N_F-N_B}{N_F+N_B}$ (NF and NB are respectively the number of decays forwards and backwards with respect to the direction of the π^+ beam) to different values between $b=-0.447\pm0.082$ and $b=+0.052\pm0.058$.

At the Venice Conference the conclusion drawn from the great difference between the values obtained for b that likely there exist no asymmetry in the Tipp decay and when it could be observed it is due to different biases.

In the present paper we are giving the results of $10000~\mathrm{J}^{-}\mu$ decays, J^{+} ending in emulsion of type R NIKFI. The stack was exposed in the J^{+} beam from the Dubna synchrocyclotron with magnetic shielding. Scanning was made through area with a microscope MBI-3 and magnification 100^{x} . Identification of $\mathrm{J}^{-}\mu$ events was made visually.

There were measured projections in the plane of emulsion of angles between the initial direction of μ meson and the π -beam direction. Angles were measured with \pm 3° precision. Fig. la shows the angular distribution. The resulting asymmetry coefficient is $\beta = -0.048 \pm 0.020$.

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Fig 1

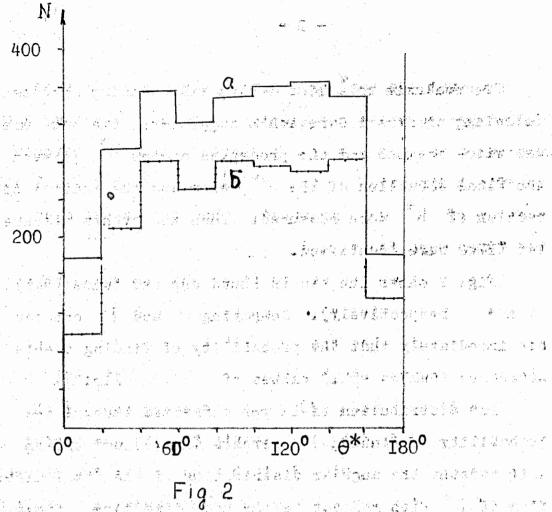
To evaluate this bias during the scanning process, following professor Gurevich's suggestion, the same area was twice scanned and the projected angles θ^* between the final direction of the π^+ meson and the initial direction of μ^+ were measured. Then the events measured two times were identified.

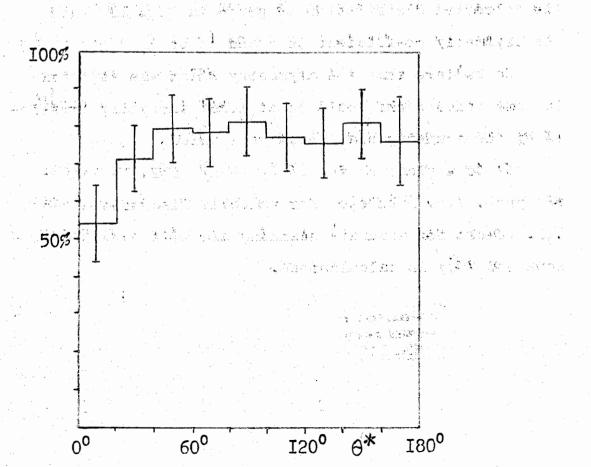
Fig. 2 shows the events found one and twice (hyst. α and β respectively). Comparing α and β one can see immediately that the probability of finding events decreases towards small values of θ^{\times} (Fig. 3).

The distribution of la was corrected through the probability of finding π - μ events (Fig.3) and taking into account the angular distribution of the final direction of π with respect to the beam direction (Fig.4). The corrected distribution is given in Fig. 1b and the asymmetry coefficient is found to be $b = 0.009 \pm 0.018$.

We believe that the asymmetry which was reported in some other works could be at least partially exparined by the scanning bias which we studied.

It is a pleasure for us to thank prof. M. Danysz and prof. V.P. Dzhelepov for valuable discussion, miss V.F. Poenko for accurate scanning and miss V.V. Chistia-kova for help in calculations.





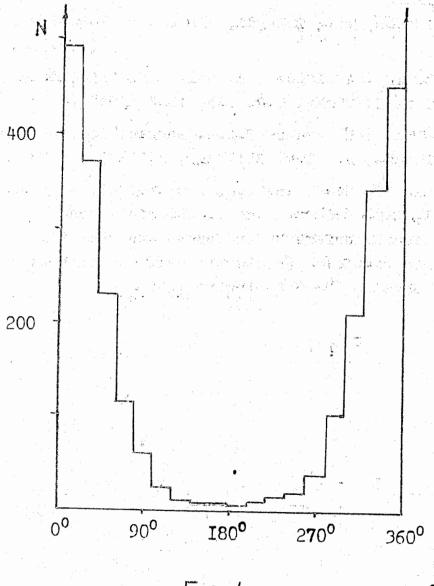


Fig 4

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