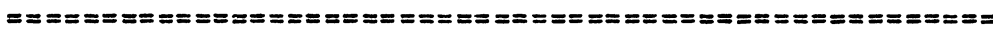


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USING PHOTOEMULSION IN PROTON DYNAMIC
POLARIZATION CONDITIONS

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The registration with photoemulsions of short-live or low-energy particles generated in collisions with polarized protons can be useful in some researches, e.g. for the determination of the relative parity in the reactions $\bar{K} + p \rightarrow \Sigma^+ K^+$ [1], or $K^- + p \rightarrow \Sigma^+ K^+$. According to [2], the determination of the spin and parity of baryon or K meson excited states is possible in certain conditions, e.g. in reactions as $\bar{K} + p \rightarrow \gamma^* + K$, or $\bar{K} + p \rightarrow \Lambda + K^*$.

An effective method for obtaining polarized protons is the dynamic one and thus polarizations as high as 70% have already been obtained [3]. In this method helium temperatures are necessary and experiments with short-live particles need the shortest distances between the photoemulsion and the crystal of $La_2 Mg_3 (WO_4)_{12} \cdot 24 H_2O$ in which the polarization of protons is carried out. Hence it is necessary to put the emulsion in direct contact with this crystal inside the cavity in the helium cry stat.

The registration properties of the photoemulsions at very low temperatures have been reported in our earlier works; e.g., in [4] it was pointed out that at 0.1°K the ILFORD G-5 emulsion has (70 ± 10)% of its normal sensitivity.

It is also necessary to bear in mind that the dielectric losses in emulsions damage the cavity Q. For this we have performed some experiments to determine the modification of Q in the presence of the emulsion inside the cavity. A photoemulsion plate (12cm² area and 400 μ thickness) was put in the center of a 7cm² cavity tuned at 37 Mc ($\lambda = 8mm$). The measurements showed that at room temperature and at liquid nitrogen temperature the cavity Q decreased more than 20 times in comparison with the value for the free

non-loaded cavity; but at helium temperature ($4,2^{\circ}\text{K}$) Q decreased only 3 times. This effect can be considerably reduced by putting the emulsion plates along the cavity walls, or by lowering the temperature more (by pumping away the helium vapour temperatures about $0,8^{\circ}\text{K}$) can be reached). But the dynamic polarization needs only insignificant power 10-50 mW [5], so even a 3 times decrease of the Q cavity is of no importance.

Consequently, the dynamic polarization method can be successfully employed, () using nuclear photoemulsions.

that are in contact with the crystal containing hydrogen for the registration of interactions.

H. ...

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