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P R O P O S A L

Search for gamma-rays from K^- captures in Hydrogen

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The experiment aims at a search for evidence that Y* is produced when K^- is captured at rest in Hydrogen. The reaction is $K^- + p \rightarrow Y^* + \gamma$.

If such γ -rays are found their energy is a measure of the mass of Y* and the width of the gamma line a measure of the width of Y*. The discrepancy between the Bubble-chamber result and the emulsion result for the width of Y* (1405) could then be resolved. The energy of γ -rays connected with Y* (1405) is expected to be 27 MeV.

Method. K^- mesons are stopped in a liquid Hydrogen target. Emulsions are used as a γ -spectrometer located outside the target. Electron pairs are measured by the multiple scattering technique. The resolution will be about 1,5 MeV in γ -ray energy and thus in Y* mass and width.

Layout. The emulsions are placed close to the Hydrogen target. They must be well shielded from all sides but the one viewing the target. The stack is to be about 3" x 2" x 30 pellicles.

Beam and Target. It is important to have a very large number of K^- mesons stopping in the Hydrogen both because of the unknownand probably small branching ratio of the proposed reaction and of the small solid angle of the detector. The best situation would then be obtained with the modified k_2^- beam of high flux and a special target. The number of stopped K^- mesons should not be less than 10^6. The experiment should in this case be run together with an electronics experiment using a large NaI crystal to detect γ-rays, using the same target and machine time. The electronics experiments will be proposed shortly.

If the experiment is run as a parasite one with a HBC as target both the flux and the solid angle of the detector will be reduced. This can of course be compensated for by a longer run.

The beam need not be extremely pure. Some π^- contamination will give γ-rays. These will cause some more work in the measurements but these γ-rays have no peak in the expected energy region.