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SEARCH FOR THE PRESENCE OF H PARTICLES IN A NEUTRAL BEAM*

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The most promising candidate for a six quark state other than the deuteron is a *uuddss* spin and isospin singlet state proposed by Jaffe,[1] and known as the H particle. The presence of three distinct flavors works in favor of a bound H. The mass of the H has been calculated in numerous models[2] and in many calculations, $M_H < 2M_\Lambda$. If the H is deeply bound, its lifetime[3] may be much longer than that of the lambda particle.

If the H particle exists and is relatively long lived, it will occur as a component of neutral secondary beams. In an experiment at the Brookhaven National Laboratory Alternate Gradient Synchroton, the apparatus of an existing rare kaon decay experiment (designed to search for $K_L \to \mu e$) was modified to search for H particles.

Several possible signatures for the H were examined. If the H is long lived, it can be detected by diffractive dissociation into two lambda particles. To this end, a dissociator consisting of eight scintillation counters with a total thickness of .1 interaction length was placed in the beam upstream of the magnetic spectrometer. A veto counter following the dissociator can be used to identify events in which all final state particles are neutral. The lambda particles are detected in the spectrometer by their $p\pi^-$ decay mode. The spectrometer has good acceptance for pairs of lambda

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particles with small relative momentum,a condition which would be characteristic of H dissociation.

Diffractive production of ΛK_s by the neutron component of the beam is a reaction of similar topology to the signal. Its 2 vee signature and dissociator signal has been used to calibrate and study the properties of the apparatus.

The pattern of energy deposited in the elements of the dissociator can be used to characterize the event. Events in which diffraction occured on protons and coherent and incoherent diffraction from carbon nuclei in the scintillator have different patterns of energy deposition.

If the H has a short lifetime so that it will decay in the apparatus, a different approach is required. A separate data set was taken to search for the H through its decay. The signature here is the appearance of lambda particles in the beam which do not point back to the production target.

Results of the dissociation search will be presented.

References

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