SLAC – PUB – 5390
December 7, 1990
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STRANGE MESON AND STRANGEONIUM SPECTROSCOPY : INTRODUCTION*

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1. INTRODUCTION

The most profitable studies of strange meson and strangeonium spectroscopy have been carried out using a strange meson beam incident upon a liquid hydrogen target. That this should be the case is readily apparent from the quark line diagrams of Figures 1a and 1b. In Figure 1a, the incident valence s quark flows through to yield an $s\bar{u}$ system by means of $u\bar{u}$ exchange in the t channel. The resulting configuration can correspond to the $s\bar{u}$ ground state (i.e. elastic scattering), or to orbital and/or radial excitations of this state (i.e. the production of strange meson resonances); in particular, Figure 1a represents the peripheral production of resonances which couple to $\overline{K}^0\pi^-$. Figure 1b similarly represents the production of $s\bar{s}$ states which couple to K^-K^+ via t channel $u\bar{s}$ exchange with production of a recoil Λ.

In contrast, the peripheral production of the K^-K^+ system from an incident π^- with recoil neutron is described by the diagram of Figure 1c. Although the t channel quark lines cross in this diagram, it is related through line reversal to the planar diagram of Figure 1d, and so may be considered on the same footing as Figure 1b. It follows that, whereas the K^-K^+ mass spectrum corresponding to Figure 1b would be expected to result from the production and decay of mainly $s\bar{s}$ resonances, that corresponding to Figure 1c should reflect the production of mainly $u\bar{u}$ states. The observed K^-K^+ mass distributions[1,2] are shown in Figure 2, and are in complete accord with this expectation; the spectrum from K^- exhibits $\phi(1020)$, $f_2'(1525)$, $\phi_3(1850)$[1] and $f_4'(2210)$[3] production, whereas that from π^- (cross-hatched histogram) has clear $f_2(1270)$, $\rho_3(1690)$ and $f_4(2050)$ signals.

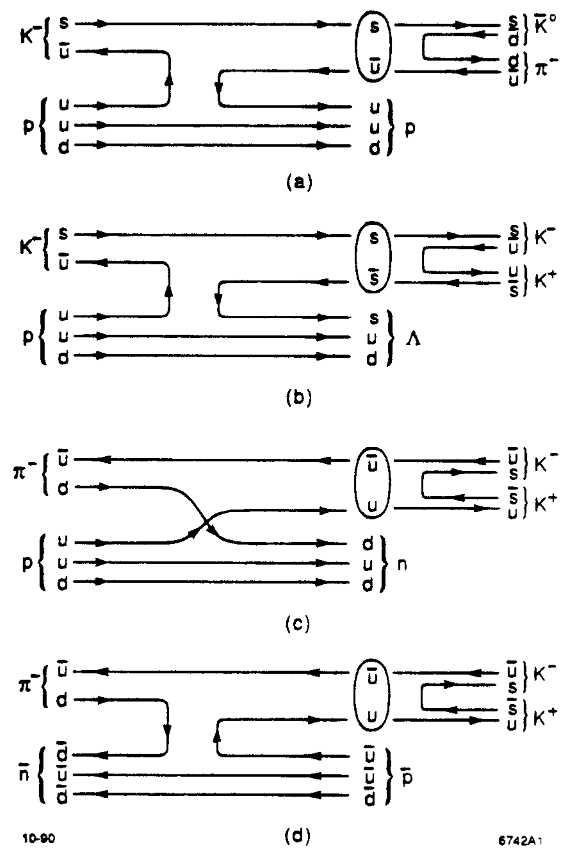

FIGURE 1
The quark diagrams discussed in the text.

* Work supported in part by the Department of Energy under contract No. DE-AC03-76SF00515; the National Science Foundation under grant Nos. PHY82-09144, PHY85-13808, and the Japan U.S. Cooperative Research Project on High Energy Physics.

Invited talk presented at the Rheinfels Workshop 1990 on Hadron Mass Spectrum, St. Goar, Germany, September 3-6, 1990

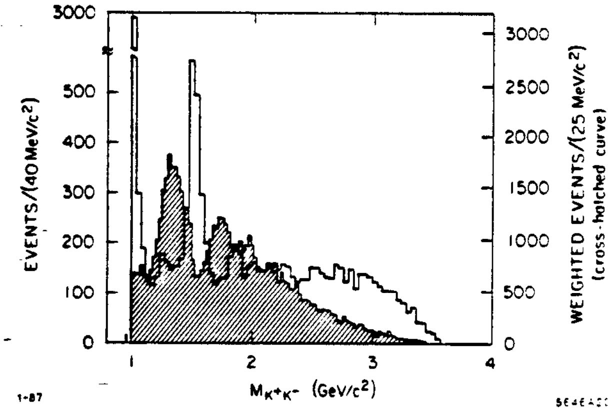

FIGURE 2
The K^-K^+ mass distributions for incident K^- and recoil Λ (clear histogram, left-hand scale), and for incident π^- and recoil neutron (cross-hatched histogram, right-hand scale).

2. PROGRAM

The program of this session has been arranged with these ideas in mind. The first talk, by Tim Bienz, will review results on strangeonium production from LASS. John Dowd will then report on a Partial Wave Analysis of the $\overline{K}^0K^+\pi^-$ system produced by incident K^-s at the MPS. Unfortunately, there are no other recent experiments which use incident kaons to investigate peripheral meson production. Consequently, the following talk by John Drinkard concerning an amplitude analysis of the $K\overline{K}\pi$ system produced in radiative J/ψ decay, is intended to contrast the amplitude structure found in this context with that observed in the K^- fixed target experiments; this applies also to the analysis of the $K\overline{K}$ system to be presented later to-day in the Tensor Meson session by Liang-ping Chen. I will then summarize the present status of strange meson spectroscopy, with a strong emphasis on LASS data, since these have yielded the only recent results. Finally Steve Godfrey will spend some time sifting through the experimental wreckage.

REFERENCES

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2. C. Evangelista et al., Nucl. Phys. B154 (1979) 381.
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