Abstract Submitted
for the DNP10 Meeting of
The American Physical Society

A Statistical Model of the Pure Glueball and Glueball Hybrids[1]

MEGHANN KENNEDY, TYLER MATOSSIAN, Seattle University — Glueballs are predicted by QCD and have been sought for years in many experiments. Although there are several candidates, glueballs are difficult to identify because they can decay into quark-antiquark pairs, mesons or other hybrid states. In this study we used the statistical model of Y-J. Zhang et al. to represent the pure glueball as a Fock state expansion in terms of gluons. Assuming detailed balance between states, we calculated a probability of 45.6% for the two-gluon state and 30.4% for the three-gluon state; the probability of subsequent states decreased with each additional gluon. The average number of gluons in a glueball was calculated to be 2.91. We represented the hybrid glueball by adding quark-antiquark pairs to the Fock state expansion. The probabilities of hybrid glueball states were calculated to explore state mixing and predict the relative probabilities with which each state can be observed in experiment.

[1]This research has been supported in part by the Research in Undergraduate Institutions program of the National Science Foundation, Grant No. 0855656.

Meghann Kennedy
Seattle University

Date submitted: 28 Jul 2010 Electronic form version 1.4