Abstract Submitted
for the APR14 Meeting of
The American Physical Society

Decays of Scalar Mesons in the Light-Front Quark Model[1] MARTIN DEWITT, High Point University — The light-front quark model (LFQM) is used to investigate the structure of the scalar mesons, mainly focusing on the three heavy isoscalar states $f_0(1370)$, $f_0(1500)$, and $f_0(1710)$. The spectrum of scalar mesons is computed by diagonalizing a relativized, QCD-inspired model Hamiltonian. The masses are then used to perform a mixing analysis which assumes that the heavy isoscalars are mixtures of $n\bar{n} = \left(\frac{u\bar{u}+d\bar{d}}{\sqrt{2}}\right)$, $s\bar{s}$, and gg. The resulting quark–glue content is used along with the meson wave–functions determined from the spectrum to compute the decay rates for $f_0 \to \pi\pi$, $f_0 \to K\bar{K}$, and $f_0 \to \eta\eta$. When the glueball contribution to the decays is ignored, the results are in poor agreement with the available data. However, when the effect of including the glueball contribution is considered, a solution is found that matches the data quite well. In this solution, the $f_0(1710)$ is mostly glueball, while the $f_0(1500)$ and $f_0(1370)$ are dominantly mixtures of $n\bar{n}$ and $s\bar{s}$.

[1]This work was done in conjunction with Dr. Chueng-Ryong Ji of NC State University and was supported by a SURA/Jefferson Lab fellowship.

Martin DeWitt
High Point Univ

Date submitted: 10 Jan 2014 Electronic form version 1.4