

Abstract Submitted
for the HAW05 Meeting of
The American Physical Society

In search of the σ resonance in $\pi^0\pi^0$ production by π^- and K^- BERNARD M.K. NEFKENS, SERGUEI PRAKHOV, JOHN W. PRICE, ALEXANDER STAROSTIN, University of California, Los Angeles — The identification of the light scalar mesons, in particular the σ state also called the $f_0(600)$ with $I^G(J^{PC}) = 0^+(0^{++})$, is a long-standing puzzle. The main σ decay mode is to two pions. The study of the process $K^-p \rightarrow \pi^0\pi^0\Lambda$ is especially attractive because the $\pi^0\pi^0$ pair is a pure $I = 0$ state. This is in contrast to $\pi^+\pi^-$, which features $I = 0$ and 1. Extensive new data have become available recently from the Crystal Ball at the AGS [1] on $\pi^-p \rightarrow \pi^0\pi^0n$, $K^-p \rightarrow \pi^0\pi^0\Lambda$, and $K^-p \rightarrow \pi^0\pi^0\Sigma^0$, which cast doubts on the picture of the σ being a simple $2\pi^0$ state with $m \sim 600$ MeV, as recommended in recent editions of the Review of Particle Physics. The latest experimental data have fully measured kinematics, so the four-dimensional variable space has been determined in its entirety; there is major structure in the $\pi^0\pi^0$ invariant mass which varies with the $\pi^0\pi^0$ angle and the incident energy.

Reference: S. Prakhov *et al.* (Crystal Ball Collaboration), Phys. Rev. C **69**, 042202 (2004); S. Prakhov *et al.* (Crystal Ball Collaboration), Phys. Rev.C **69**, 045202 (2004); S. Prakhov *et al.* (Crystal Ball Collaboration), Phys. Rev. C **70**, 034605 (2004).

Bernard M. K. Nefkens
University of California, Los Angeles

Date submitted: 26 May 2005

Electronic form version 1.4