

Two Photon Exclusive Production of Charged Pion and Kaon Pairs^{*}

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Two-Photon Exclusive Production of
Charged Pion and Kaon Pairs

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy
in Physics

by

Gary S. Greenbaum

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1995

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Curriculum Vita

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"Two-Photon Exclusive Production of $\pi^+\pi^-$ and K^+K^- ," Gary S. Greenbaum, plenary talk on Exclusive $\gamma\gamma$ Reactions, in *The Xth International Workshop on Photon-Photon Collisions*, Submitted for publication in Proceedings of the Workshop, Sheffield, UK, 1995.

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ABSTRACT OF THE DISSERTATION

Two-Photon Exclusive Production of
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by

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Doctor of Philosophy in Physics
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Professor Wayne Vernon, Chair

Two-photon exclusive hadron production at large momentum transfer probes the short distance physics of perturbative Quantum Chromodynamics and explores the long distance physics of bound-state quark dynamics. The differential cross section is measured for the exclusive reactions $\gamma\gamma \rightarrow \pi^+\pi^-$ and $\gamma\gamma \rightarrow K^+K^-$ in the two-photon invariant mass region $1.4 \leq M_{\gamma\gamma} < 4.0 \text{ GeV}/c^2$ and center-of-mass scattering angle $|\cos \theta^*| < 0.8$. The SU(3)-flavor symmetry breaking effects of the kaon wave function are examined. This analysis is performed using 139 pb^{-1} of untagged data collected with the TPC/Two-Gamma detector.