

Abstract Submitted
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Results of PrimEx Experiment¹ PAWEL AMBROZEWICZ, North Carolina A&T State University, PRIMEX COLLABORATION — A precision measurement of neutral pion lifetime was carried out at the Jefferson Lab - the PrimEx experiment. The measurement probed one of the most fundamental symmetry predictions of low energy Quantum Chromodynamics, the chiral anomaly, via the Primakoff effect, coherent π^0 production off a nuclear Coulomb field. The calculation of the π^0 radiative width, obtained using the transition amplitude in the chiral limit, yields 7.725 eV. Next-to-leading order calculation of this quantity, in the framework of Chiral Perturbation Theory, gives $8.1 \text{ eV} \pm 1.0\%$ while the calculation in the QCD Sum Rule regime results in $7.93 \text{ eV} \pm 1.5\%$. Data were collected, for ^{12}C and ^{208}Pb targets, and covered a range of photon energies and angles that allowed clean separation of the Primakoff contribution from competing photoproduction processes. The validity of the measurement is confirmed by concurrent cross section measurements for two other electromagnetic processes, e^+e^- -pair production and Compton scattering. The result approaches the precision mentioned in recent theoretical calculations. Thus the measurement of the π^0 radiative decay width, or in turn π^0 lifetime, provides a stringent test of this theory prediction. Results will be presented.

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Pawel Ambrozewicz
North Carolina A&T State University

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