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Precision Measurement of the Neutral Pion Lifetime[1]

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As the lightest particle in the hadron spectrum, the π^0 meson plays an important role in understanding the fundamental symmetries of QCD at low-energy. The $\pi^0 \to \gamma\gamma$ decay offers a key test of the QCD predictions based on the chiral anomaly and spontaneous chiral symmetry breaking. The theoretical calculations over the last decade have reached the precision of 1% in the π^0 radiative decay width. The experimental measurement of this parameter with a comparable accuracy will be an important test of QCD. The PrimEx collaboration at Jefferson Lab developed and performed two experiments to measure the π^0 decay width via the Primakoff effect. The published result from the first experiment (PrimEx-I) has achieved the accuracy of 2.8% in the total uncertainty. The second experiment (PrimEx-II) was carried out with a goal of 1.4% precision. The preliminary results from the PrimEx-II experiment will be presented.

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