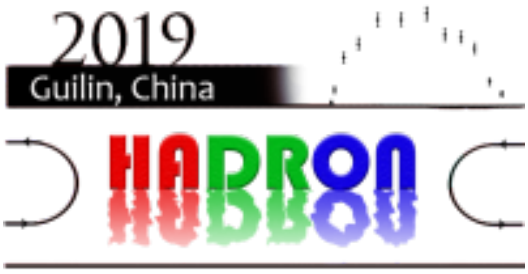

Contribution ID: **100** Type: **Parallel**

Neutral Pion Lifetime-Final Result from PrimEx

Sunday, 18 August 2019 17:20 (20 minutes)

As the lightest and the simplest hadronic particle, the neutral pion plays a crucial role in understanding the symmetries of QCD at low-energy. The $\pi 0 \to \gamma\gamma$ decay width offers a fundamental test of the QCD predictions based on the chiral anomaly and spontaneous chiral symmetry breaking. The theoretical calculations over the past two decades have reached 1% precision in the decay amplitude of the $\pi 0$ into two photons. The experimental measurement of this fundamental parameter with a comparable accuracy will provide a stringent test of QCD. The PrimEx collaboration at Jefferson Lab has developed and performed two experiments (PrimEx I&II) to measure the $\pi 0$ radiative decay width via the Primakoff effect. The published result from the first experiment (PrimEx-I) reached 2.8% in the total uncertainty that has led to an improvement of the average value in Particle Data Group by more than a factor of two and half. Data analysis for the second experiment (PrimEx-II) is recently completed with significantly improved precision than the PrimEx-I result. The final PrimEx result has reached 1.5% accuracy in the $\pi 0 \to \gamma\gamma$ decay width. This result agrees to the chiral anomaly prediction and is 2σ lower than the high order low-energy QCD predictions. The details of the PrimEx experiment and the physics impacts will be discussed.

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Session Classification: Session 4: Hadron decays, production and interactions

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