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Neutral pion radiative decay width precision measurement at Jefferson Lab[1]

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The neutral pion is the lightest strongly interacting particle in Nature. As such, the properties of π^0 decay are especially sensitive to the underlying fundamental symmetries of quantum chromodynamics (QCD). In particular, the π^0 decay width is primarily defined by the braking effects of axial and chiral symmetries (chiral anomaly) in QCD. Theoretical activities in this domain over the last years resulted in a high precision (1% level) prediction for the π^0 decay width. The PrimEx collaboration at Jefferson Lab has developed and performed two new experiments to measure the π^0 decay width with high precision using the Primakoff effect. The published result from the first experiment (PrimEx-I), $\Gamma(\pi^0$ = 7.820.14(stat.) 0.17(syst.) eV, is a factor of 2.1 more precise than the previously accepted value, and it is in agreement with the chiral anomaly prediction. The second experiment (PrimEx-II) was performed in 2010 with a goal of 1.4% total uncertainty to address the next-to-leading-order chiral perturbation theory calculations. The results from the PrimEx experiments will be presented and discussed in this talk.

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