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Testing the chiral anomaly and measuring the radiative width of the $\rho(770)$ in Primakoff reactions at COMPASS

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The COMPASS experiment at CERN has collected an extensive data set with a pion beam impinging on nuclear targets during the years 2009 and 2012. In this data set, Primakoff events are recorded, which are characterized by a single-photon interaction between beam pion and target nucleus. Primakoff events with $\pi^-\pi^0$ in the final state allow us to measure the direct coupling of three pions two one photon - a process, which is driven by the chiral anomaly and described by the anomalous form factor $F_{3\pi}$. Besides the contribution from $F_{3\pi}$, the invariant mass distribution of the final state shows a dominant contribution from the $\rho(770)$ resonance appearing in the s-channel. Previous analysis date back to the 80ies and extract either $F_{3\pi}$ or the radiative width of the ρ independently. We will present new results from the COMPASS measurement, which for the first time combines the extraction of $F_{3\pi}$ and $\Gamma_{\rho\to\pi\gamma}$.

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