Abstract Submitted
for the HAW05 Meeting of
The American Physical Society

Magnetic moment of the Delta(1232)-resonance in chiral EFT VLADIMIR PASCALUTSA, MARC VANDERHAEGHEN, William and Mary/ Jefferson Lab — The $\Delta(1232)$-isobar is the most distinguished and well-studied nucleon resonance. However, such a fundamental property as its magnetic dipole moment (MDM) has thusfar escaped a precise determination. The problem is generic to any unstable particle whose lifetime is too short for its MDM to be measurable in the usual way through spin precession experiments. A measurement of the MDM of such an unstable particle can apparently be done only indirectly, in a three-step process, where the particle is first produced, then emits a low-energy photon which plays the role of an external magnetic field, and finally decays. In this way the MDM of Δ^{++} is accessed in the reaction $\pi^+ p \to \pi^+ p\gamma$ while the MDM of Δ^+ can be determined using the radiative pion photoproduction ($\gamma p \to \pi^0 p\gamma'$). In this paper we will present a new chiral effective field theory calculation of the radiative pion photoproduction ($\gamma p \to \pi^0 p\gamma'$) in the Δ-resonance region. This work is aimed at a model-independent extraction of the Δ^+ magnetic moment from new precise measurements of this reaction. It also predicts the chiral behavior of Δ's magnetic moment, which can be used to extrapolate the recent lattice QCD results to the physical point.

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Date submitted: 25 May 2005 Electronic form version 1.4