An Indirect Determination of the Gerasimov-Drell-Hearn (GDH) Sum Rule for the Deuteron at Low Energies M.W. AHMED, M. BLACKSTON, B. PERDUE, W. TORNOW, H. WELLER, Duke U/TUNL for GDH at HIγS — The GDH sum rule relates the helicity dependent photoabsorption cross section asymmetry to the anomalous magnetic moment, κ, of the target. A direct measurement of the GDH sum rule for the deuteron requires polarized target and circularly polarized γ-rays. However, at low energies, an indirect measurement can be made using an unpolarized target and linearly polarized γ-rays. It is shown that near photodisintegration threshold a measurement of the analyzing power obtained with linearly polarized γ-rays can be used to extract the $^1S_0$ (M1) strength (σ(M1)) and the GDH integrand can be related to this quantity. An analysis of data from the High Intensity Gamma-Ray Source (HIγS) on photodisintegration of the deuteron is presented. Analysis of data to extract the GDH integrand using other measurements of σ(M1) such as the analyzing power in the polarized neutron capture reaction, as well as unpolarized photodisintegration of the deuteron along with measurements of the outgoing neutron polarization will also be presented. A fit to the world data analyzed in this manner between E$_\gamma$ of 2.39 MeV and 10 MeV gives a GDH integralvalue of -669$^{+205}_{-43}$ μb. This result is the first confirmation of the large $^1S_0$ (M1) contribution predicted by H. Arenhövel *et al.* to dominate the GDH sum rule integrand of the deuteron near threshold.

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