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**Compton Scattering and Photo-absorption Sum Rules on Nuclei** MIKHAIL GORSHTEYN, TIMOTHY HOBBS, J. TIMOTHY LONDERGAN, ADAM P. SZCZEPANIAK, Indiana University — We revisit the photo-absorption sum rule for real Compton scattering from the proton and from nuclear targets. In analogy with the Thomas-Reiche-Kuhn sum rule appropriate at low energies, we propose a new “constituent quark model” sum rule that relates the integrated strength of hadronic resonances to the scattering amplitude on constituent quarks. We study the constituent quark model sum rule for several nuclear targets. In addition we extract the  $J = 0$  pole contribution for both proton and nuclei. Using the modern high energy proton data we find that the  $J = 0$  pole contribution differs significantly from the Thomson term, in contrast with the original findings by Damashek and Gilman. We discuss phenomenological implications of this new result.

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