

Abstract Submitted
for the SES06 Meeting of
The American Physical Society

Studying the Phase-Space Structure of Nucleons Using Generalized Parton Distributions SAEED AHMAD, SIMONETTA LIUTI, HELI HONKANEN, SWADHIN K. TANEJA, University of Virginia — We study the correlation of momentum and coordinate space distributions of partons which are measured in Deeply Virtual Compton Scattering (DVCS) reactions. Being able to understand the phase-space distributions of quarks, we hope to look into the question of ‘how much quark orbital angular momentum contributes towards the nucleon spin?’ It was in fact suggested recently [1] that using the information provided by DVCS experiments, one can develop a complete three dimensional spatial picture of nucleons, along with the momentum distributions (the so-called Wigner distributions). However, in order pin down the spatial distribution in the longitudinal direction one has to take into account the constraint imposed by the uncertainty principle. In addition, similarly to inclusive deep-inelastic scattering, the electromagnetic probe has an extended length in the longitudinal direction, known in the literature as “Ioffe time” [2]. Using the Generalized Parton Distributions (GPDs) obtained in [3] we define and evaluate “Generalized Ioffe time” distributions as a function of the additional degrees of freedom—both transverse, $t = -\Delta^2$ and longitudinal, ξ —extracted from DVCS experiments. [1] A. V. Belitsky, X. d. Ji and F. Yuan, Phys. Rev. D **69**, 074014 (2004) [2] B. L. Ioffe, Phys. Lett. B **30**, 123 (1969); V. Del Duca, S. J. Brodsky and P. Hoyer, Phys. Rev. D **46**, 931 (1992); V. Braun, P. Gornicki and L. Mankiewicz, Phys. Rev. D **51**, 6036 (1995). [3] S. Liuti and S. K. Taneja, Phys. Rev. D **70**, 074019 (2004); H. Honkanen, S. K. Taneja, S. Ahmad and S. Liuti, *in preparation*.

Simonetta Liuti
University of Physics

Date submitted: 22 Aug 2006

Electronic form version 1.4