Photon-pion transition form factor and pion distribution amplitude[1] ANATOLY RADYUSHKIN, ODU and Jefferson Lab — The pion distribution amplitude (DA) $\varphi_\pi(x)$ [1,2] is an important function accumulating information about momentum sharing between the quarks of the pion when the latter is in its valence $\bar{q}q$ configuration. It is an inherent element of perturbative QCD calculations of hard exclusive reactions involving the pion. A scenario is investigated in which the leading-twist pion DA $\varphi_\pi(x)$ is approximated by the pion decay constant f_π for all essential values of the light-cone fraction x. A model for the light-front wave function $\Psi(x, k_\perp)$ is proposed that produces such a DA and has a rapidly decreasing (exponential for definiteness) dependence on the light-front energy combination $k_\perp^2/x(1-x)$. It is shown that this model easily reproduces the fit of recent large-Q^2 BABAR data [3] on the photon-pion transition form factor. Some aspects of scenario with flat pion distribution amplitude are discussed.

[1] A. V. Radyushkin, JINR-P2-10717 (1977); English translation: arXiv:hep-ph/0410276.
[2] G. P. Lepage and S. J. Brodsky, Phys. Lett. B **87**, 359 (1979).
[3] B. Aubert *et al.* [BABAR Collaboration], arXiv:0905.4778 [hep-ex].

Anatoly Radyushkin
ODU & Jefferson Lab

Date submitted: 24 Jun 2009

Electronic form version 1.4