

# *Landau Institute for Theoretical Physics of RAS*

*Nikolai N. Nikolaev*

## *Two NICA-RFBS grants with participation of the Landau Institute:*

1. High- $p_t$  physics: Landau-Pomeranchuk Migdal effect and related phenomena (Dr. B.G. Zakharov and collaborators)
2. Weak parity violation in high energy hadronic interactions (Landau-Budker Inst. Collaboration: Yu. Shatunov, I. Koop, A. Milstein, N. Nikolaev et al.)

The goal: theoretical analysis of feasibility of a missing test of the SM in the pure nonleptonic sector and formulation of the optimal experimental scheme. The observable:  $pA$  &  $dA$  total cross section vs. the beam helicity. Still another option: proton to neutron charge exchange promising higher sensitivity to parity violation --- needs much more scrutiny.

## *The early attempts:*

1. Tons of low energy data: radiative polarized neutron capture and fission, total cross section etc. First observed by Abov & Krupchitzky et al in 1964. Can be reasonably well accounted for by the meson exchange and effective field theory approaches.
2. ANL ZGS - 1984, the observed  $AL=(2.65\pm 0.60\pm 0.36)\times 10^{-6}$  for 6 GeV protons on the water target by at least one order in magnitude exceeds theoretical expectations.