Working Group on Small x and High Parton Densities

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I. Introduction (Conveners) *[2]*

II. Physics at small x

1. Unitarity and QCD (A. Stasto, M. Strikman, J. Bartels) *[4]*
   a. From DGLAP to non-linear evolution equations in QCD: saturation *(plot of the $\ln 1/x - \ln Q^2$ plane with the name of evolution equations and the saturation line)*
   b. Saturation in pQCD: GLR-MQ, the CGC *(plot of the CGC evolution???)*
   c. The importance of diffraction.
2. Models motivated by HERA data *(would it be possible to gather all descriptions - one of each type - into three plots, one for F_2, one for F_L and one for inclusive diffraction???, one example from each type of models) [4]*
   a. DGLAP evolution (J. Rojo, S. Forte)
   b. Linear resummation schemes (S. Forte, A. Stasto)
   c. Dipole models (J. Albacete, A. Stasto, G. Watt)
3. Low-x physics at the LHC: limitations in pp, pPb and PbPb (B. Cole, D. d'Enterria, C. Salgado) *(plot of the $\ln 1/x - \ln Q^2$ coverage, C. Salgado has it for pA) [2]*
4. Nuclear targets:
   a. Situation for nuclei (N Armesto, M. Strikman, K. Eskola) *(plot of the comparison of DGLAP approaches for nuclear ratios together with Mark's FGS) [1]*
   b. Significance for the heavy ion program (N. Armesto, B. Cole, U. Wiedemann) *[1]*
5. Implications for the ultrahigh energy neutrino interactions (A. Stasto, N. Armesto) *(plot of the relevant regions in x and Q^2 for tau eloss and neutrino cross section???) [1]*

6. Perturbative and non-perturbative aspects of final state radiation and hadronization: jets and semi-inclusive observables in ep and eA (the ep part to be agreed with the QCD/EW group) (B. Cole, W. Brooks) *(this involves from the determination of α_s via jets and the input for fragmentation functions in the proton, to the corresponding nuclear cases) [1]*

III. Prospects at the LHeC *(if not explicit, every numbered item should include a brief description of the present situation)*

1. Inclusive measurements, structure functions *(kinematics plot for ep, and by David d'Enterria for eA)*
   a. Predictions from different approaches for proton and nuclei (J. Albacete, A. Stasto, N. Armesto) *(plots of the comparison of different predictions and the pseudodata) [2]*
   b. F_2, F_L pseudodata for proton and Pb vs. (x, Q^2) for varying electron beam energies (P. Newman, M. Klein, N. Armesto) *[2]*
   c. Impact of $F_2/F_L/F_2^c$ ep and eD pseudo-data on DGLAP fits to the low-x nucleon structure (to be agreed with the QCD/EW group) (J. Rojo, M.Klein) *[2]*
   d. Impact of pseudo-data on DGLAP fits to nuclei (C. Salgado, K. Eskola, H.Paukkunen) *[1]*
   e. Testing the observability of non-linear dynamics from $F_2/F_L/F_2^c$ ep and eA data (J. Rojo, M. Klein, N. Armesto, P. Newman) *[1]*
2. Inclusive diffraction *(plot of the ratio for p and Pb)*
   a. Inclusive diffraction pseudodata (P. Newman) *[1]*
   b. Ratio diffractive/total (A. Stasto, H. Kowalski) *[1]*
   c. Predictions for nuclear targets (M. Strikman, C. Marquet) *[1]*
3. Exclusive vector meson production
   a. $\sigma(W)$ for proton and nuclei (P. Newman, H. Kowalski, T. Rogers, T. Teubner, G. Watt) *(plot of cross sections vs. W for J/ψ and Υ, SMOKING GUN?) [2]*
   b. Amplitude vs. impact parameter for proton and Pb (ibid.) *[1]*
   c. DVCS and GPDs (J. Collins, C. Weiss) [1]
4. Jet and multi-jet observables, parton dynamics (J. Collins, H. Jung, E. Avsar, K. Kutak)
   a. Forward jets, dijets, angular decorrelation *(updated THERA plot) [1]*
   b. Unintegrated PDFs *[1]*

IV. Experimental issues (to be agreed with the Detector WG, maybe shifted to their chapter of the CDR) *[4]*

1. Forward acceptance and tagging, coherent vs. incoherent diffraction in the nuclear case (D. d'Enterria,S. Levonian, A. Bunyatyan, P. van Mechelen, A. de Roeck)
2. Particle identification (???)