SMALL-X & MPI WG messages to communities

Obvious: Messages depend from target community

- **Non-small-x community at LHC**
- **Non-high-energy (non-LHC) physics community**
- **Outreach**

Messages to non-HEP (non-LHC) physics community

- **Asymptotic high-energy collisions is all about of vacuum excitation by colliding particles**
- **The main fundamental vacuum excitation is a vacuum state, Pomeron**
- **All asymptotic high-energy collisions can be described in terms of vacuum state exchanges (Pomeron exchanges):**

- elastic scattering by elastic Pomeron exchange
- diffraction by quasi-elastic Pomeron exchange
- inelastic processes by inelastic Pomeron exchange
- saturation (unitarity restoration) of rising x-sections by multiple Pomeron exchanges
- interactions of complex hadronic objects by mulptiple (Pomeron) interactions of their constituents

QCD provides a base for microscopic description of hadrons, their interactions and QCD vacuum:

- **hadron structure and soft interactions: QCD-based models, lattice QCD**
- **large angle hard scattering is well described by perturbative QCD**
- **semihard (small angle) scattering, potentially dominant at asymptotic energies, is under developing**

With advent of LHC the domain of semihard perturbative QCD should be greatly extended with enhancement of Pomeron (small-x) effects and it can be tested and studied

Messages to non-small-x community at LHC

- **Fundamental problem: understanding of high-energy strong interaction in all its complexity (Mark's title version)**

- **Before LHC expectations:**

with advent of LHC the domain of semihard perturbative QCD should be greatly extended with enhancement of small-x effects

It should allow searches for:

1) **high-energy asymptotic pQCD approaches (BFKL)**
2) **non-linear saturation effects in pp-, pA- and AA- collisions**
3) **multi-parton interactions in in pp-, pA- and AA- collisions**
4) **elastic and diffraction scatterings at new energies**
5) **all above is to answer question: how close we approach to high-energy asymptotics?**

- **After LHC Run !:**

1) **Leading Log BFKL and DGLAP cannot describe CMS dijet data at large y, while Next-to-Leading Log BFKL describes data**
2) **at 7 TeV such processes like Higgs VBF and Z VBF doesn't requre BFKL, while ME+PS does a good job, however, it can be vice versa situation at 13 TeV**
3) **some saturation effects observed in pp-, pA- and AA- collisions**
4) **MPI observed in few process; it has large impact on several observables**

Surprise: CMS ridge effect still requires a good explanation

Obstacles at Run I (it can be overcome at Run II):

- **limited low luminosity runs**
- **limited dectector capabilities**
- **no MC generators for complicate Next-to-Leading-Log BFKL-approach**
- **no pure DGLAP MC generators**