

Workshop on the physics of HL-LHC, and perspectives at HE-LHC
 CERN, November 1st 2017

nPDFs / small-x / UPC: Theory

Néstor Armesto

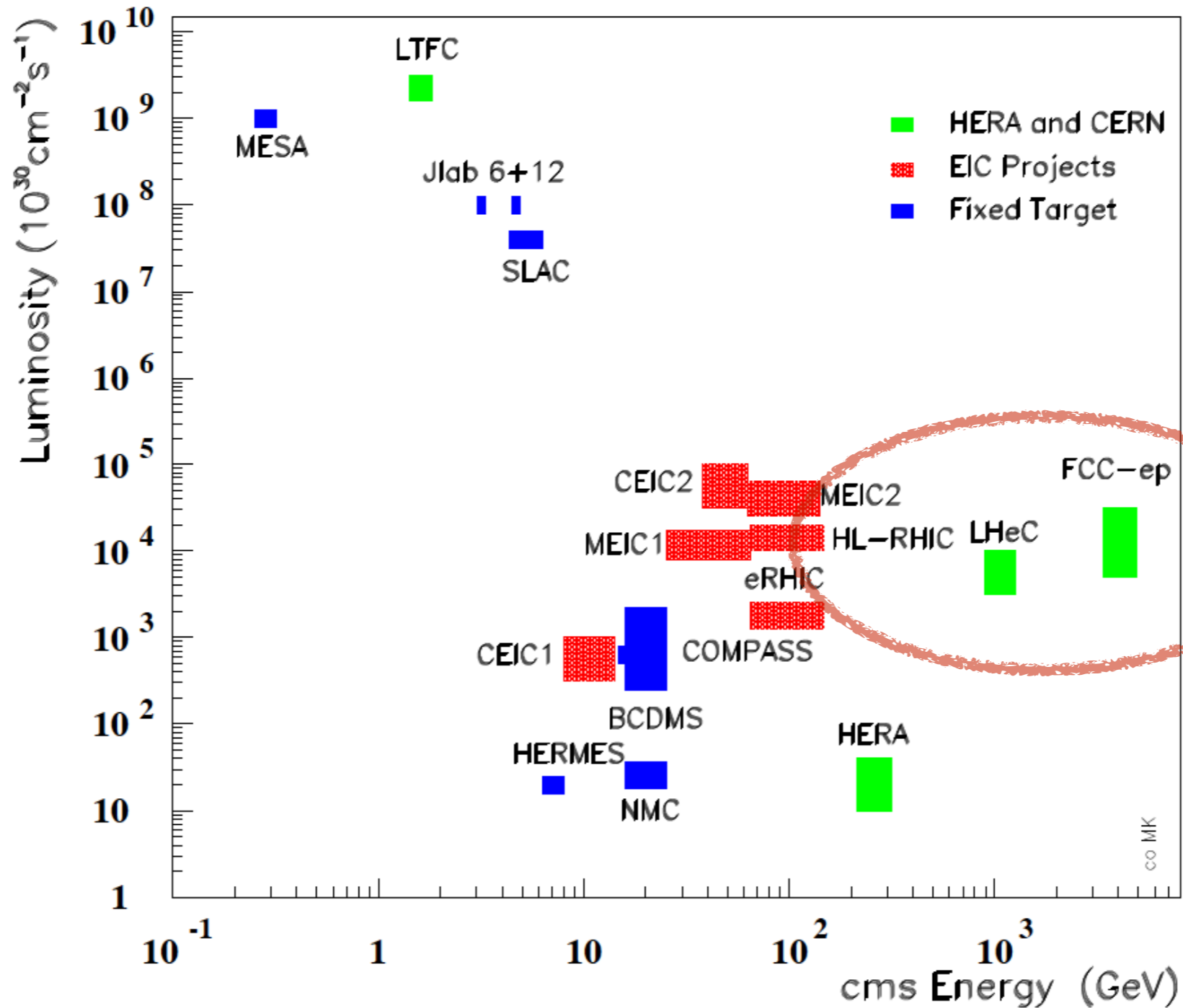
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pA/AA & eA :

- LHeC: DIS experiment at the HL- or HE-LHC.

Lepton-Proton Scattering Facilities



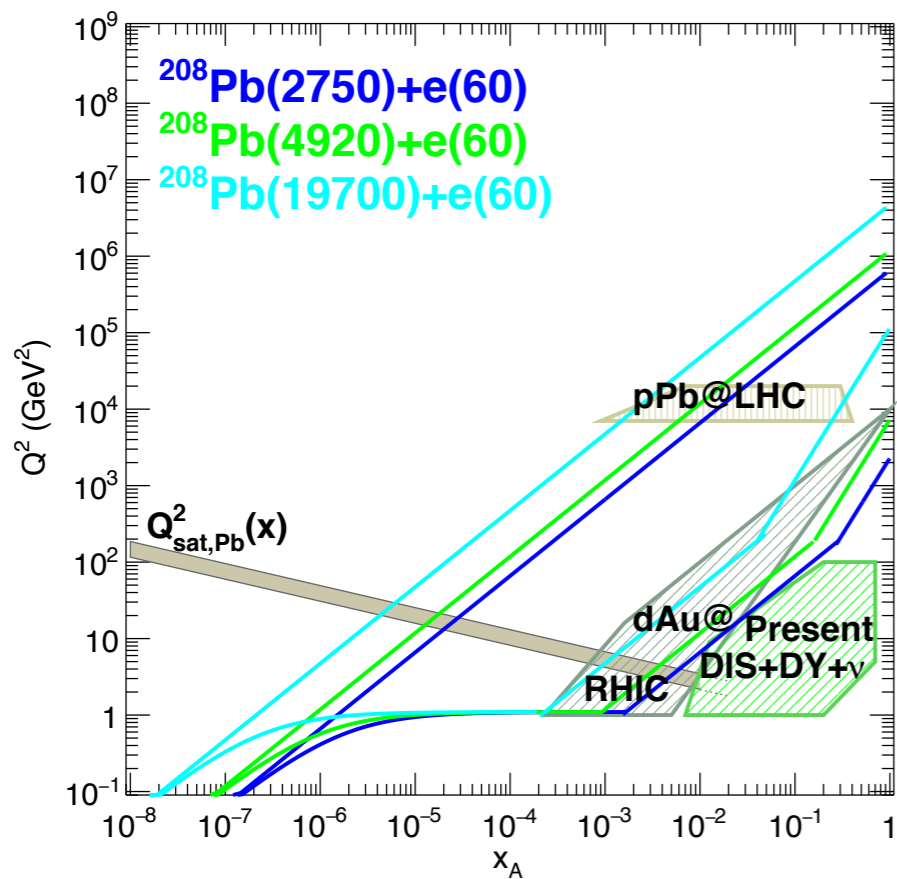
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parameter [unit]	LHeC (HL-LHC)	eA at HE-LHC	FCC-he
E_{Pb} [PeV]	0.574	1.03	4.1
E_e [GeV] Bruning et al.	60	60	60
$\sqrt{s_{eN}}$ electron-nucleon [TeV]	0.8	1.1	2.2
bunch spacing [ns]	50	50	100
no. of bunches	1200	1200	2072
ions per bunch [10^8]	1.8	1.8	1.8
$\gamma\epsilon_A$ [μm]	1.5	1.0	0.9
electrons per bunch [10^9]	4.67	6.2	12.5
electron current [mA]	15	20	20
IP beta function β_A^* [cm]	7	10	15
hourglass factor H_{geom}	0.9	0.9	0.9
pinch factor H_{b-b}	1.3	1.3	1.3
bunch filling H_{coll}	0.8	0.8	0.8
luminosity [$10^{32}\text{cm}^{-2}\text{s}^{-1}$]	7	18	54
Integrated lumi. in 10 y. (fb^{-1})	6	15	45

pA/AA & eA:

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- eA pros:
 - Clean experimental environment: lower multiplicity, no pileup, fully constrained kinematics;
 - More controlled theoretical setup: most first-principles calculations in a dilute-dilute/dense regime.



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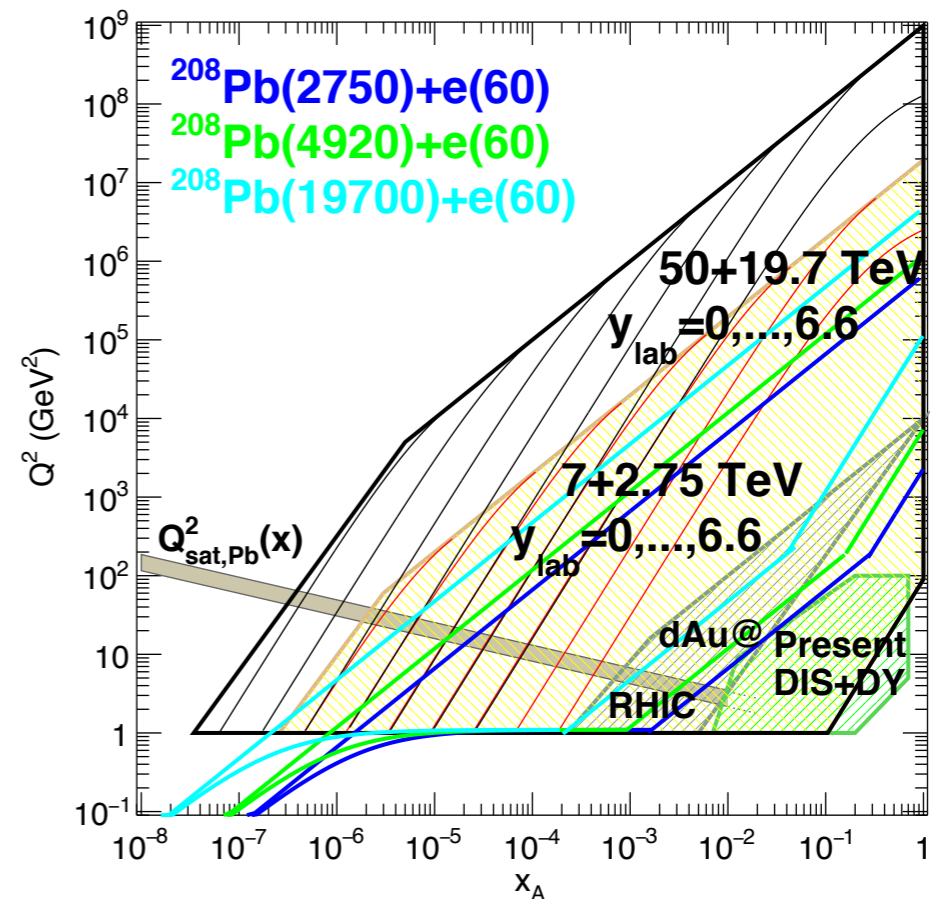
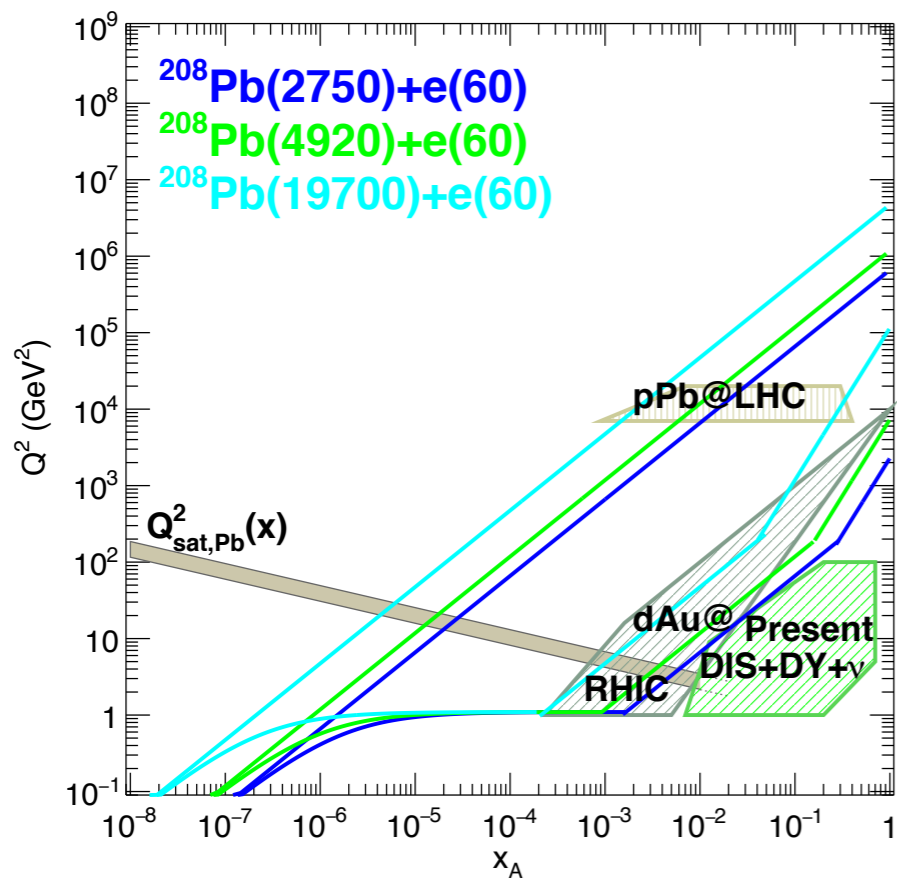
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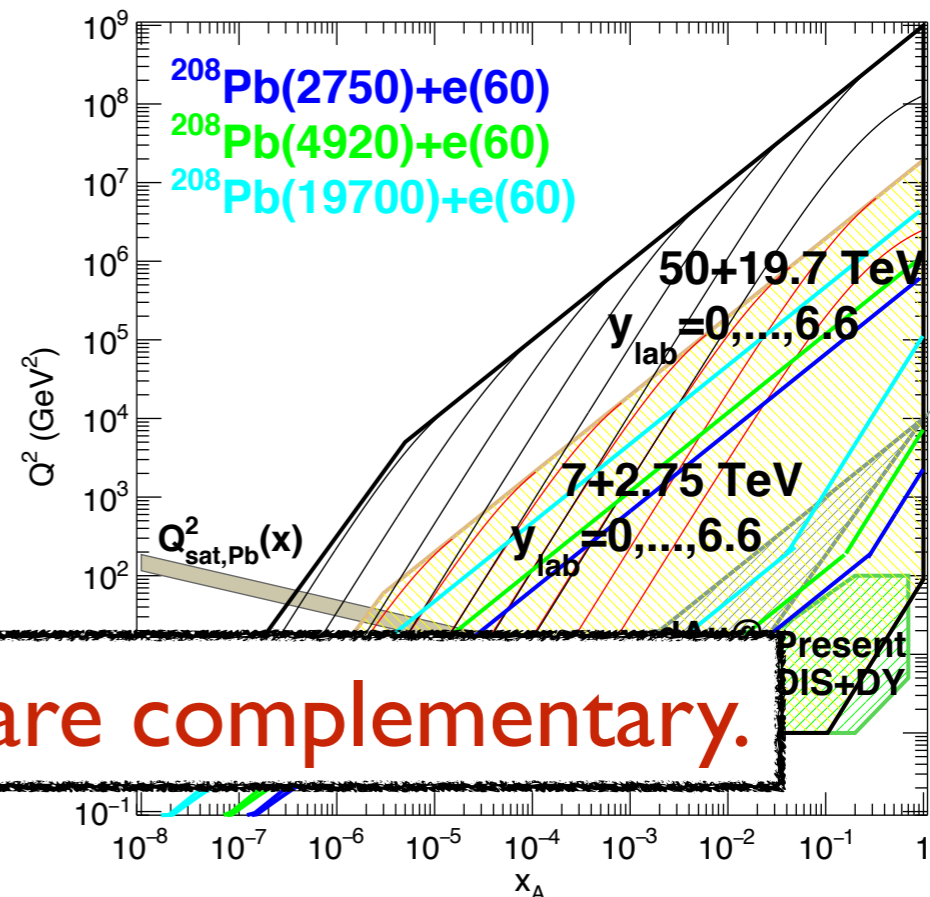
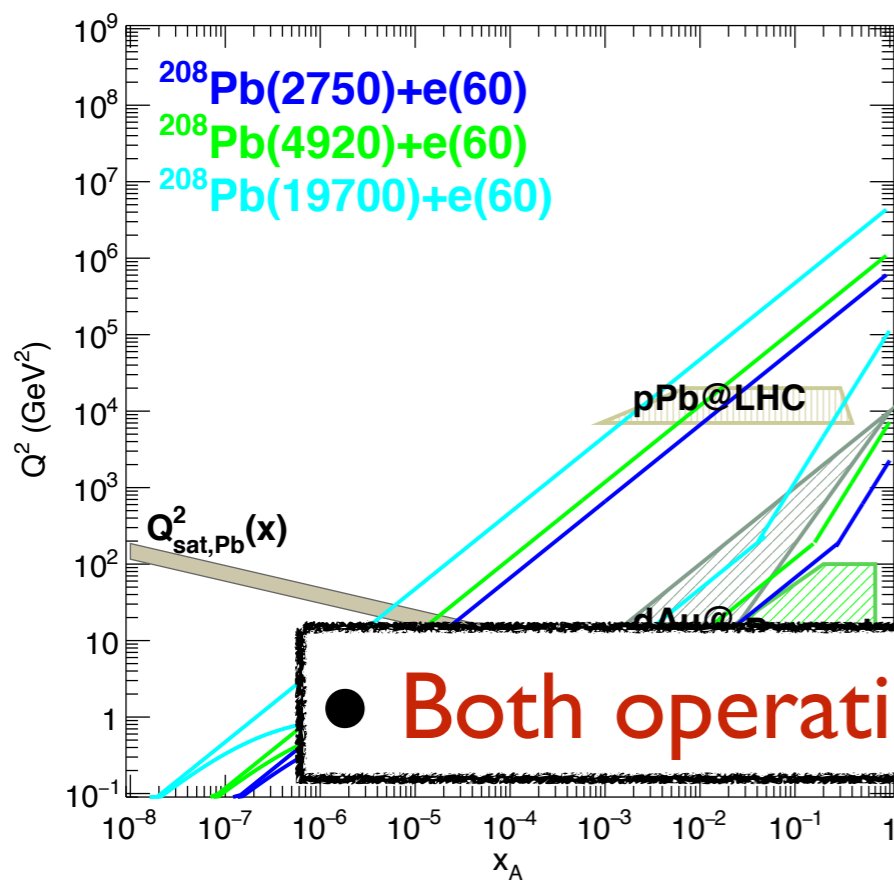
- Unbeatable kinematic reach and luminosities.

- High-density effects more prominent e.g. multiple scattering, eventual collective effects.



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● Both operation modes are complementary.

Contents:

1. nPDFs.

2. Small x .

3. UPCs.

4. Summary.

See the talks by John Jowett and Francesco Bossu.