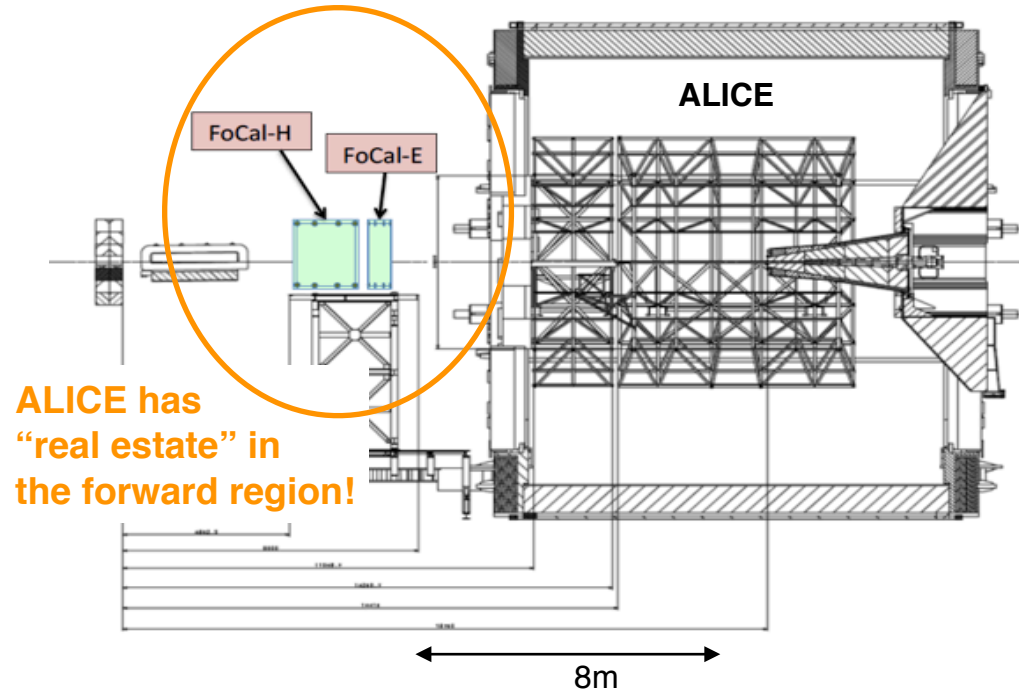
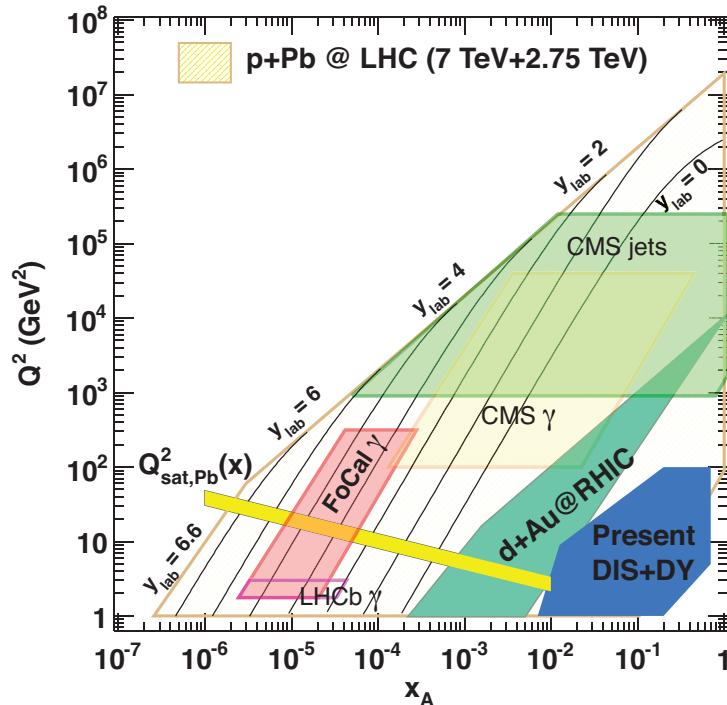


Future Low-x Opportunities at the LHC: ALICE FoCal

Study the low-x gluon structure (nuclear PDFs, CGC) in a new kinematic regime (small x and low Q^2) at the LHC (>LS2/3 2020+)



Strategy: Utilize direct photons ($\gamma^{\text{dir-jet}}$) at forward rapidity $y \sim 3.3-5$ ($x \sim 10^{-6}$)

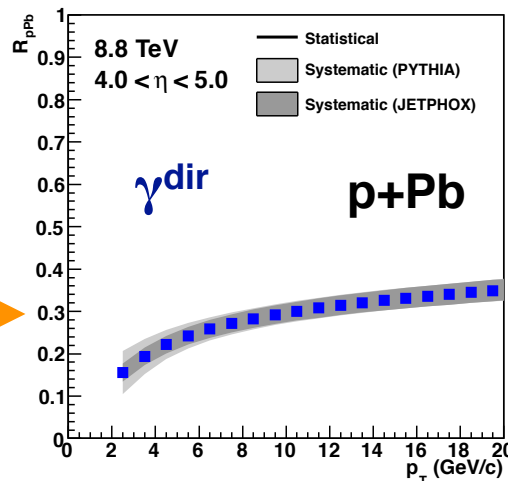
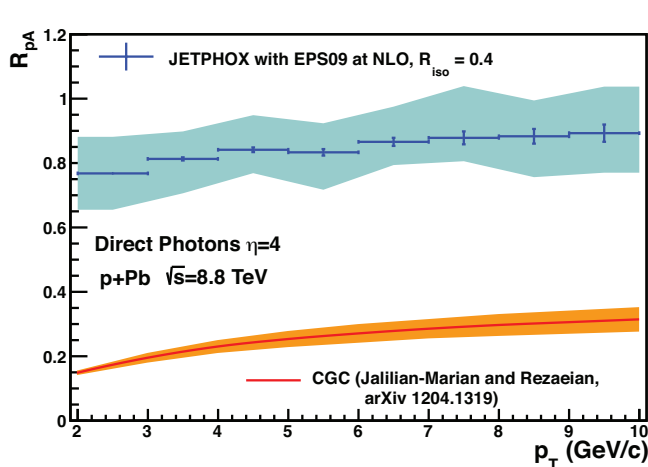
FoCal-E: High-granularity EMCal* (decay photon rejection $> 95\%$)

FoCal-H: HCal (improved isolation and added full-jet capabilities)

*Compact silicon-tungsten (Si/W) sampling electro- magnetic calorimeter with longitudinal segmentation.

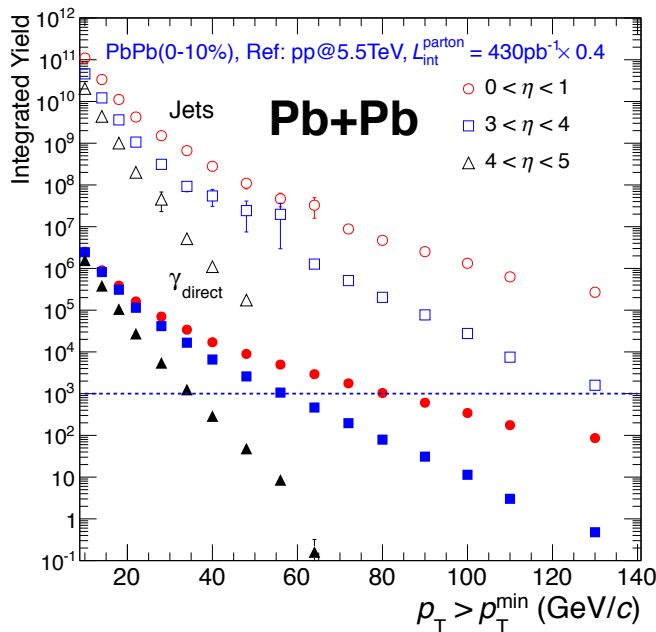
Physics Performance* ($p+Pb$ and $Pb+Pb$)

*Simulations with “final” design (EMCal and HCal) and proposed beam-pipe/structure modifications are ongoing!



System	\sqrt{s} [TeV]	Coincidence Type	p_T^{max} [GeV]	
			γ_{dir} -Jet	Jet-Jet
p+p	14	F-M	20	> 100
		F-F	30	70
p+Pb	8.8	F-M	20	> 100
		F-F	30	70
Pb+Pb (0-10%)	5.5	F-M	50	> 100
		F-F	50	80

Table 2: Kinematic reach p_T^{max} [GeV] defined by a minimum integrated yield of 1k for γ_{dir} -jet and jet-jet at forward-forward rapidities (F-F) (integrated over $\eta = 3 - 5$) and forward-mid-rapidity (F-M) coincidences.



Expect excellent γ^{dir} (R_{pPb}) capabilities at $y \sim 4-5$ at low Q^2

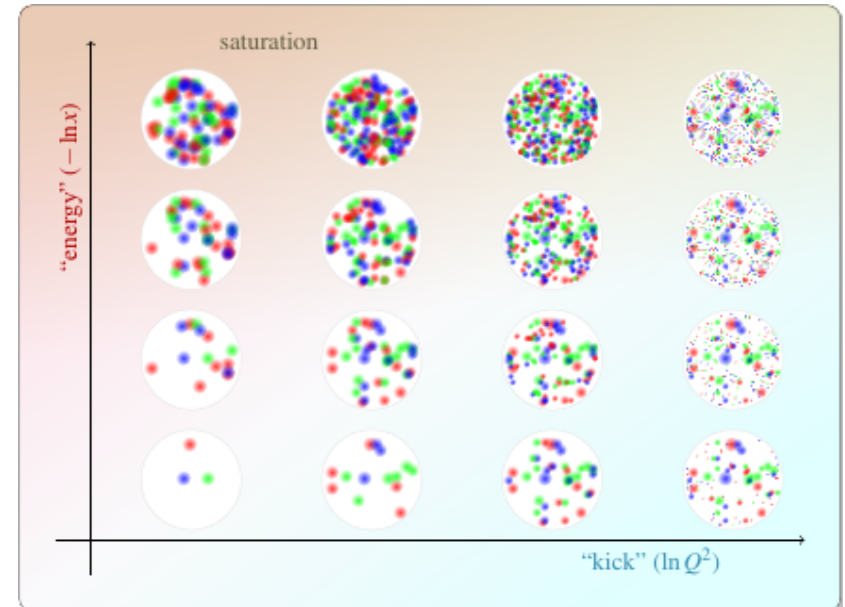
Combining γ^{dir} -jet and jet+jet measurements allows to study the evolution in x and Q^2 , map out the onset, and explore the properties of QCD matter in the saturation regime.

Pb+Pb: γ^{dir} -jet and jet+jet at forward and mid-forward rapidity allows to study partonic energy loss over a wide kinematic range

Future Low- x Opportunities at the LHC: ALICE FoCal

ALICE has “real estate” at forward rapidity!

Comprehensive γ^{dir} -jet and jet+jet measurement program at forward rapidities in p+p and p+Pb at the LHC allows to study the evolution in x and Q^2 , map out the onset, and explore the properties of QCD matter in the saturation regime.



Future forward detector upgrade (ALICE FoCal) would provide *timely* (>LS2/3 2020+) and *complementary* low- x physics opportunities for the US Physics Community!