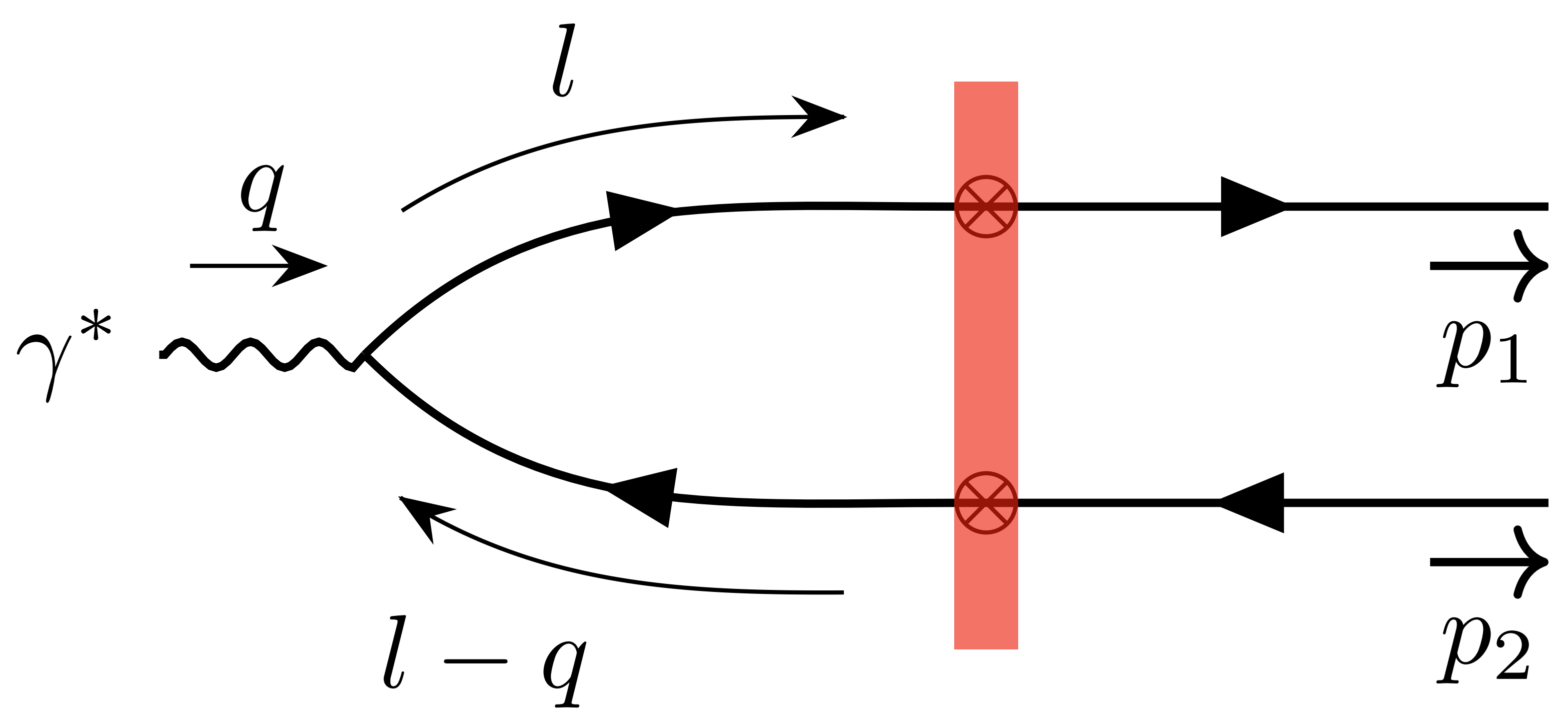
Exclusive dijet production at small-x

Kinematic Constraints

Farid Salazar
Stony Brook University

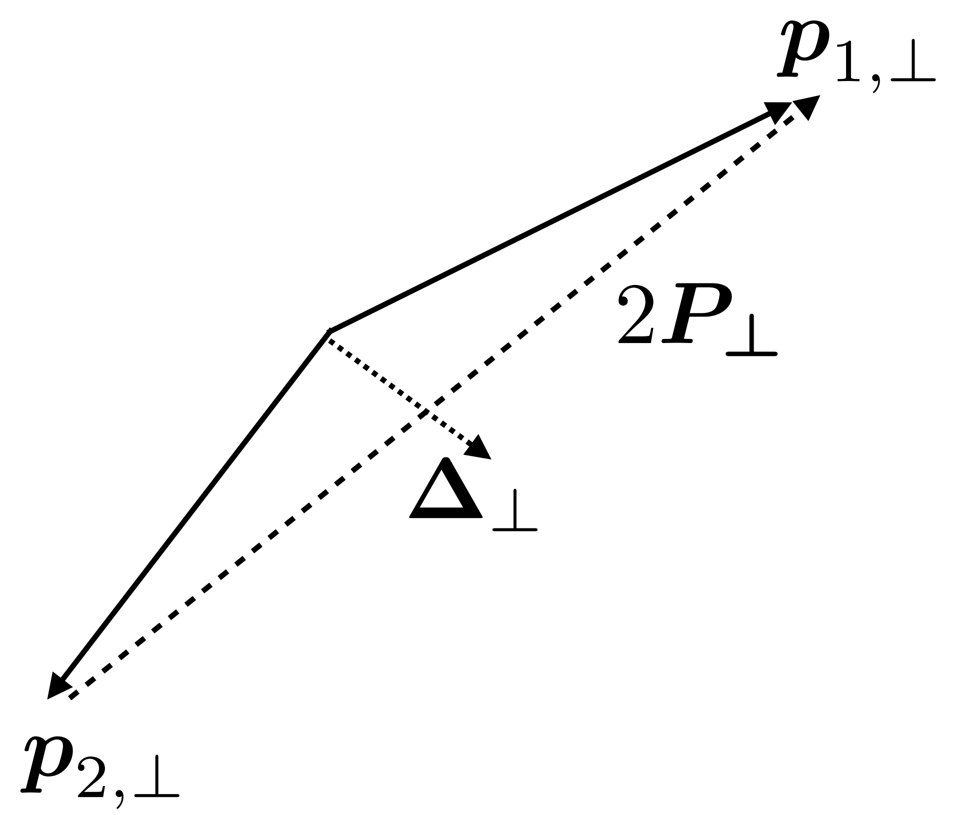


$$\boldsymbol{P}_\perp = \frac{1}{2}\left(\boldsymbol{p}_{\perp,1} - \boldsymbol{p}_{\perp,2}\right)$$

relative dijet

$$\boldsymbol{\Delta}_\perp = \boldsymbol{p}_{1,\perp} + \boldsymbol{p}_{2,\perp}$$

momentum imbalance



*our results are at partonic level
Need to include jet fragmentation (e.g. Pythia)

Observable: sizable angular modulations in the angle between $\boldsymbol{P}_\perp$ and $\boldsymbol{\Delta}_\perp$ probing color charge correlations, Wigner distribution, proton/nucleus color charge gradients.

$|\boldsymbol{P}_\perp| \sim 4 - 6 \text{ GeV}$ $\quad\quad$ $|\boldsymbol{\Delta}_\perp| \sim 0.1 - 1 \text{ GeV}$

Diffractive dijet production and Wigner distributions from the color glass condensate. H. Mäntysaari, N. Mueller, B. Schenke. Phys. Rev. D 99, 074004 (2019)

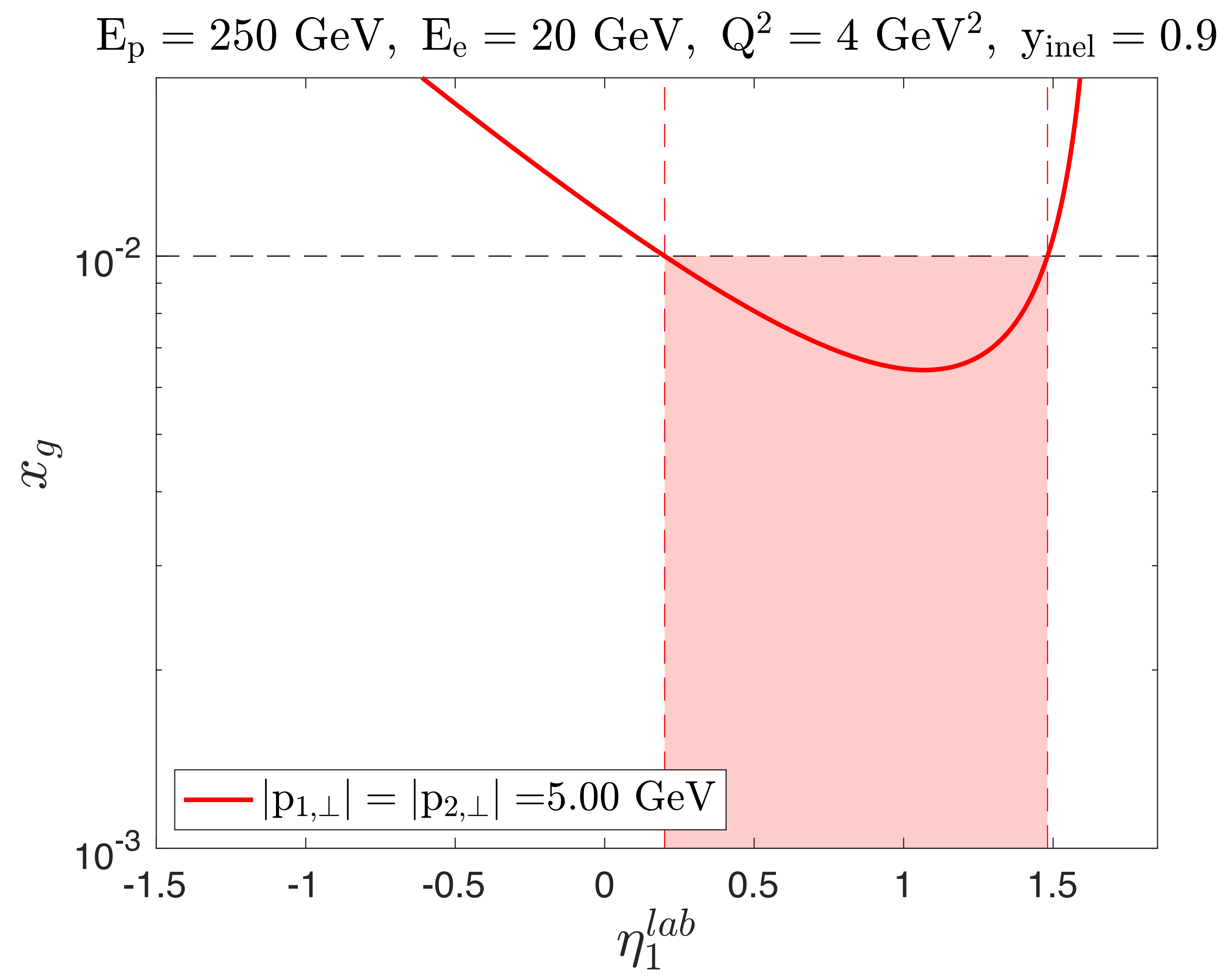
Diffractive dijet production in impact parameter dependent saturation models. FS, B. Schenke. Phys. Rev. D 100, 034007 (2019)

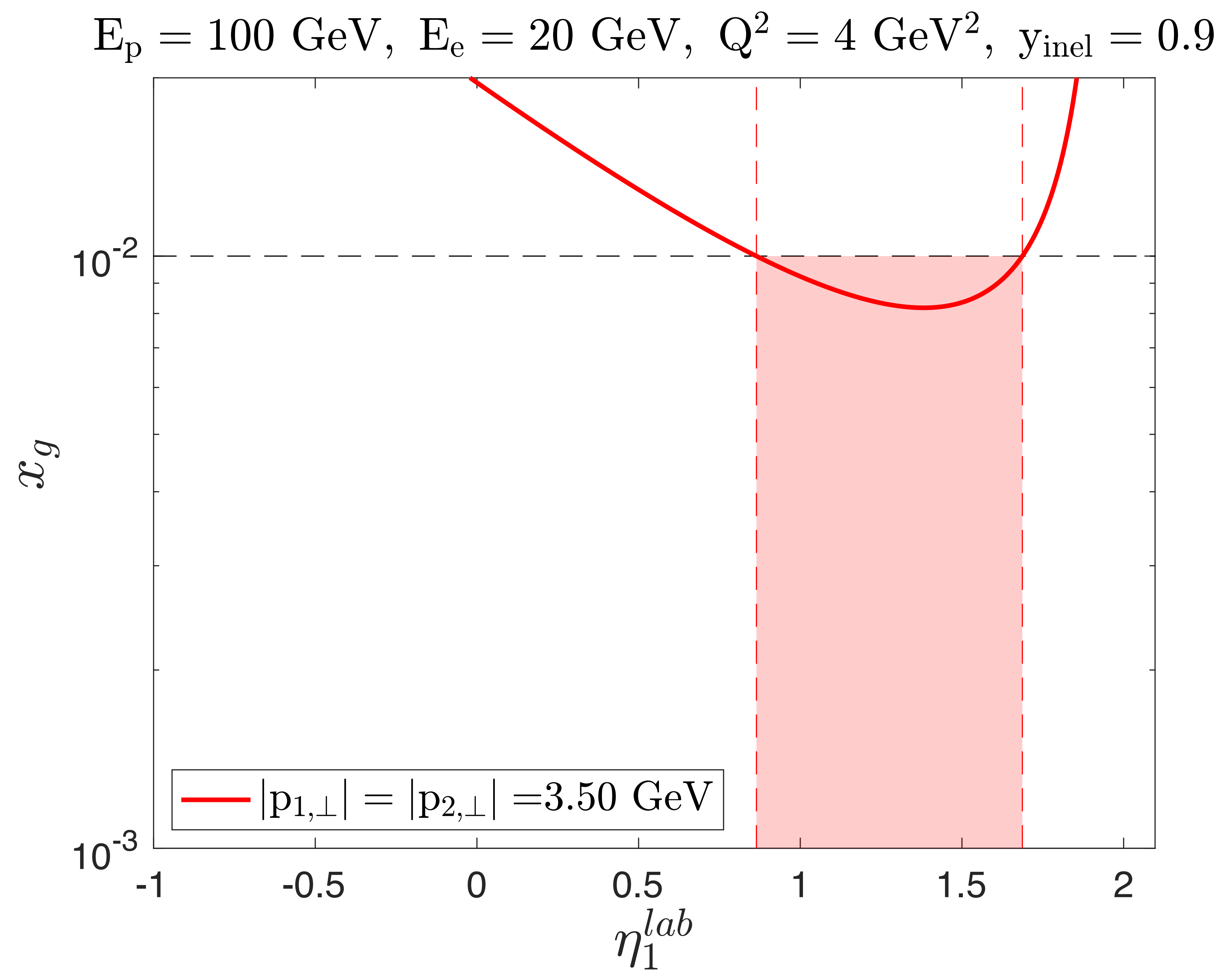
For more details look slides at https://indico.bnl.gov/event/8534/contributions/37652/
Look also at Heikki's talk at Temple meeting: https://indico.bnl.gov/event/7449/contributions/35851/

Constraints on the (pseudo-)rapidity of jets

The phase space of our jets is restricted by the requirement $x_g < 10^{-2}$

We choose two different values of proton/nucleon energy E_p : $250\ \mathrm{GeV}$ (left) and $100\ \mathrm{GeV}$ (right).





Solid line shows the value of x_g probed kinematics as a function of η for fixed $|p_{1,\perp}| = |p_{2,\perp}|$.
The shaded region show the allowed rapidity window.

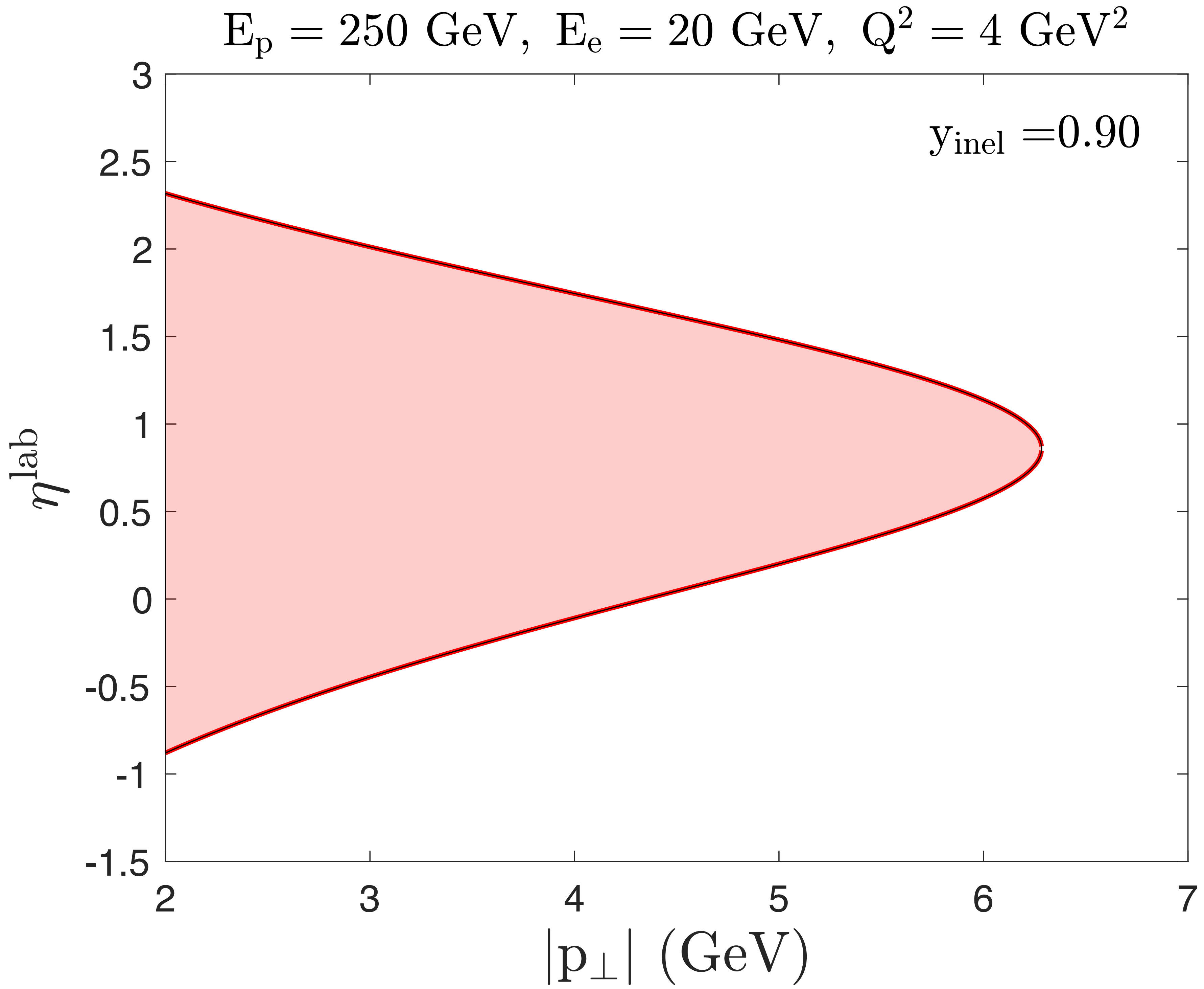
Dashed horizontal line is reference for $x_g = 10^{-2}$

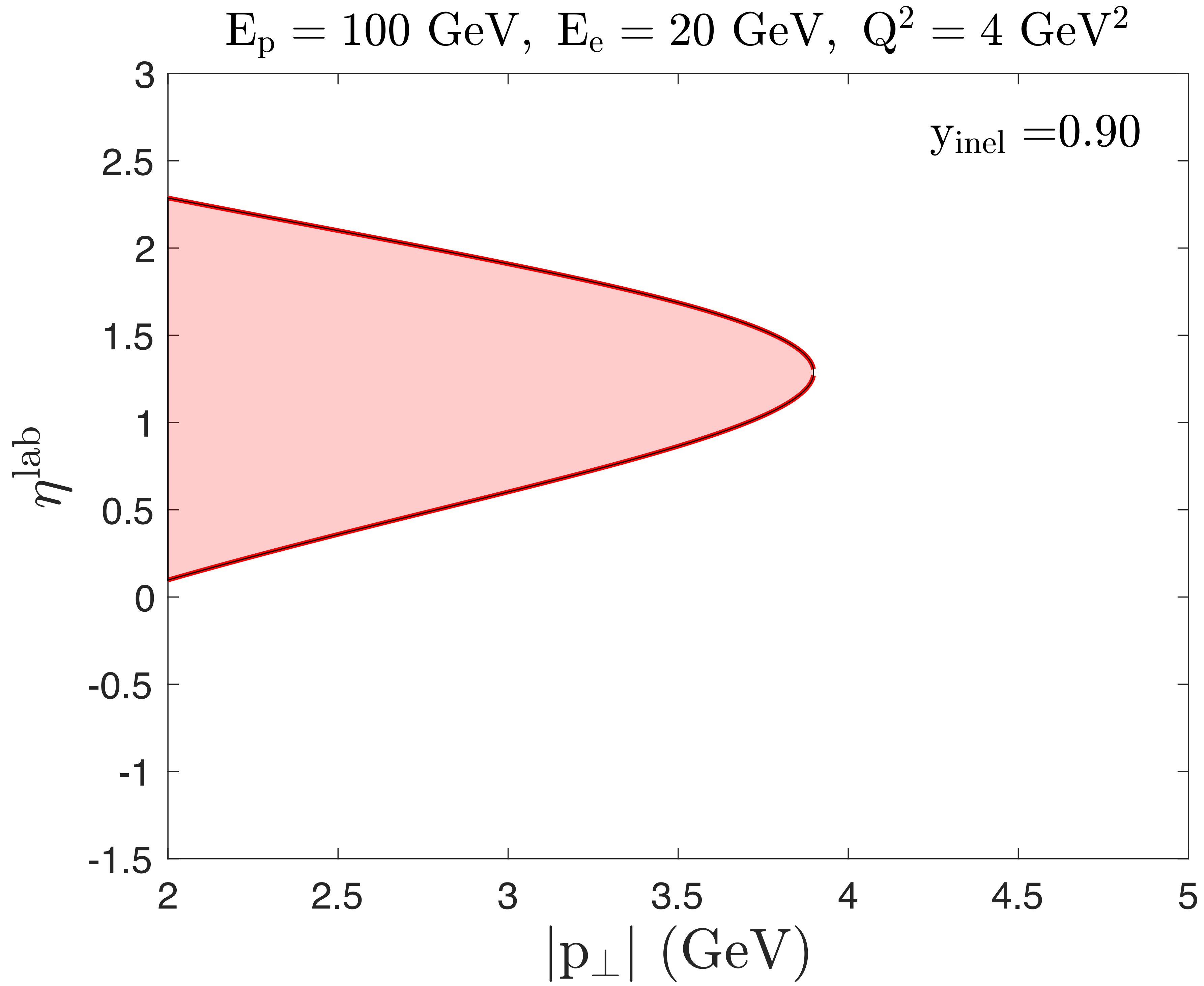
Convention: $\eta > 0$ for jets propagating in electron beam direction

Constraints on the (pseudo-)rapidity of jets

The phase space of our jets is restricted by the requirement $\mathrm{x_g} < 10^{-2}$

Phase space in $(\mathrm{p}_\perp, \eta)$





The shaded region is the allowed phase space that satisfies $\mathrm{x_g} < 10^{-2}$.

For inelasticity $y_{\mathrm{inel}} \sim 1$ one can access jets with $|p_\perp| \sim 4-6\ \mathrm{GeV}$ for $E_p = 250\ \mathrm{GeV}$ in a window of $\triangle\eta \sim 1-2$
$|p_\perp| \sim 3-4\ \mathrm{GeV}$ for $E_p = 100\ \mathrm{GeV}$

Convention: $\eta > 0$ for jets propagating in electron beam direction