

Update on recent experimental and theoretical works

- ATLAS: $H_b \rightarrow J/\psi p K^-$

- D0: $H_b \rightarrow J/\psi p X$

- Diffractive photoproduction of J/ψ and Y using holographic QCD: gravitational form factors and GPD of gluons in the proton Kiminad A. Mamo* and Ismail Zahed

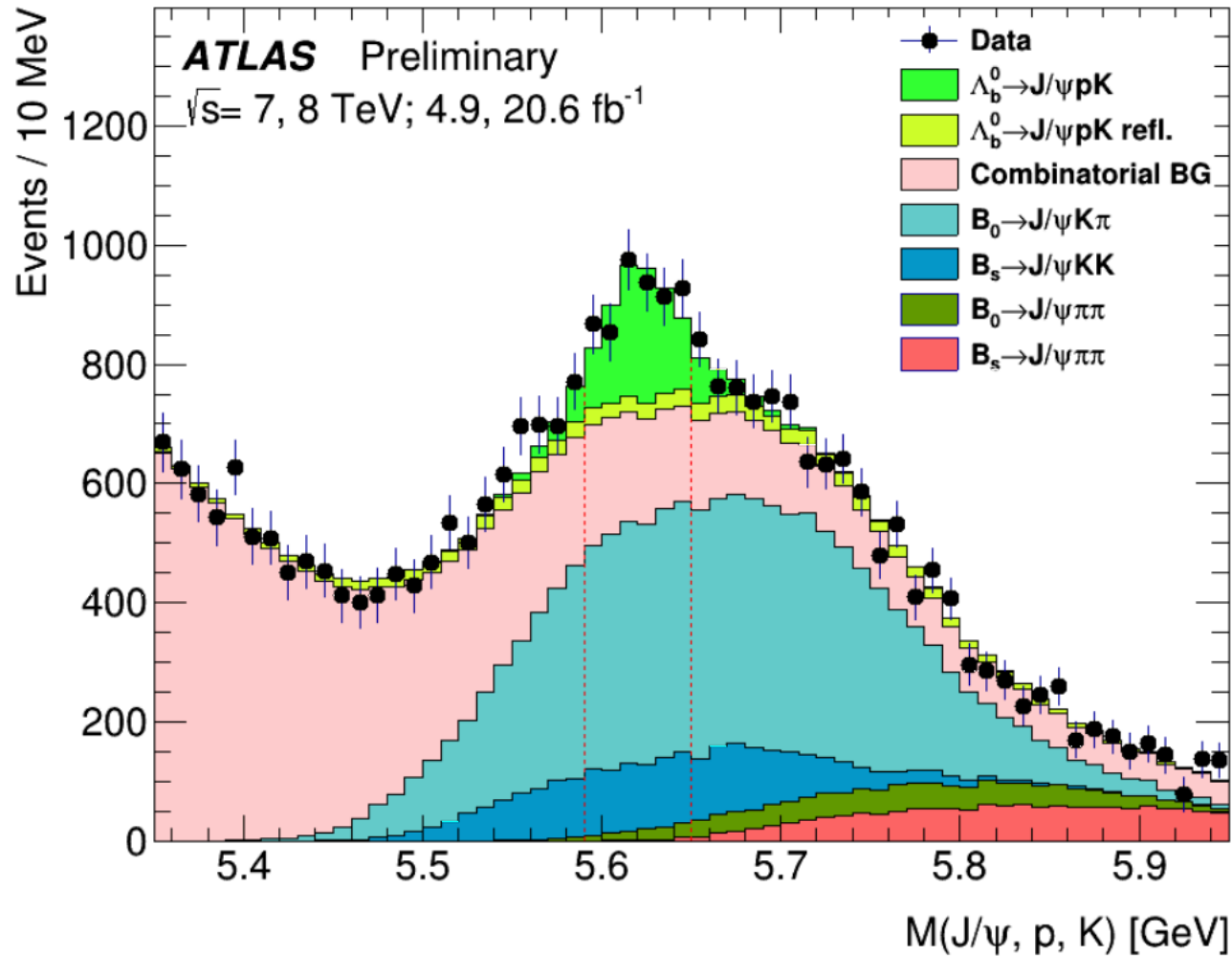
- Discussions with Alex D., Guy de Teramond, Raza Sufian, Tianbo Liu

- Discussions with Lech Szymanowski

$$H_b \rightarrow J/\psi p K^-$$

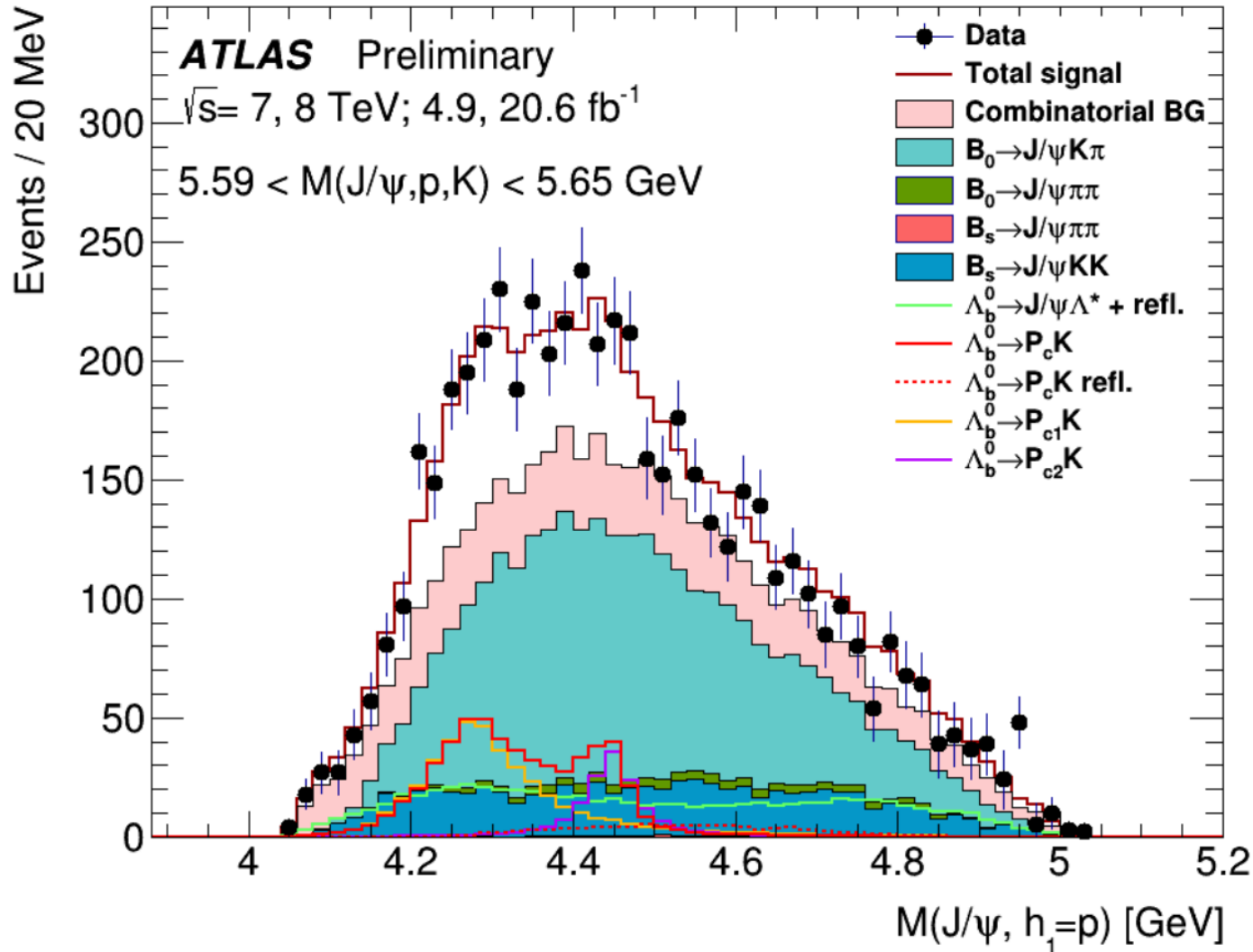
ATLAS

<http://inspirehep.net/record/1759585/files/ATLAS-CONF-2019-048.pdf>



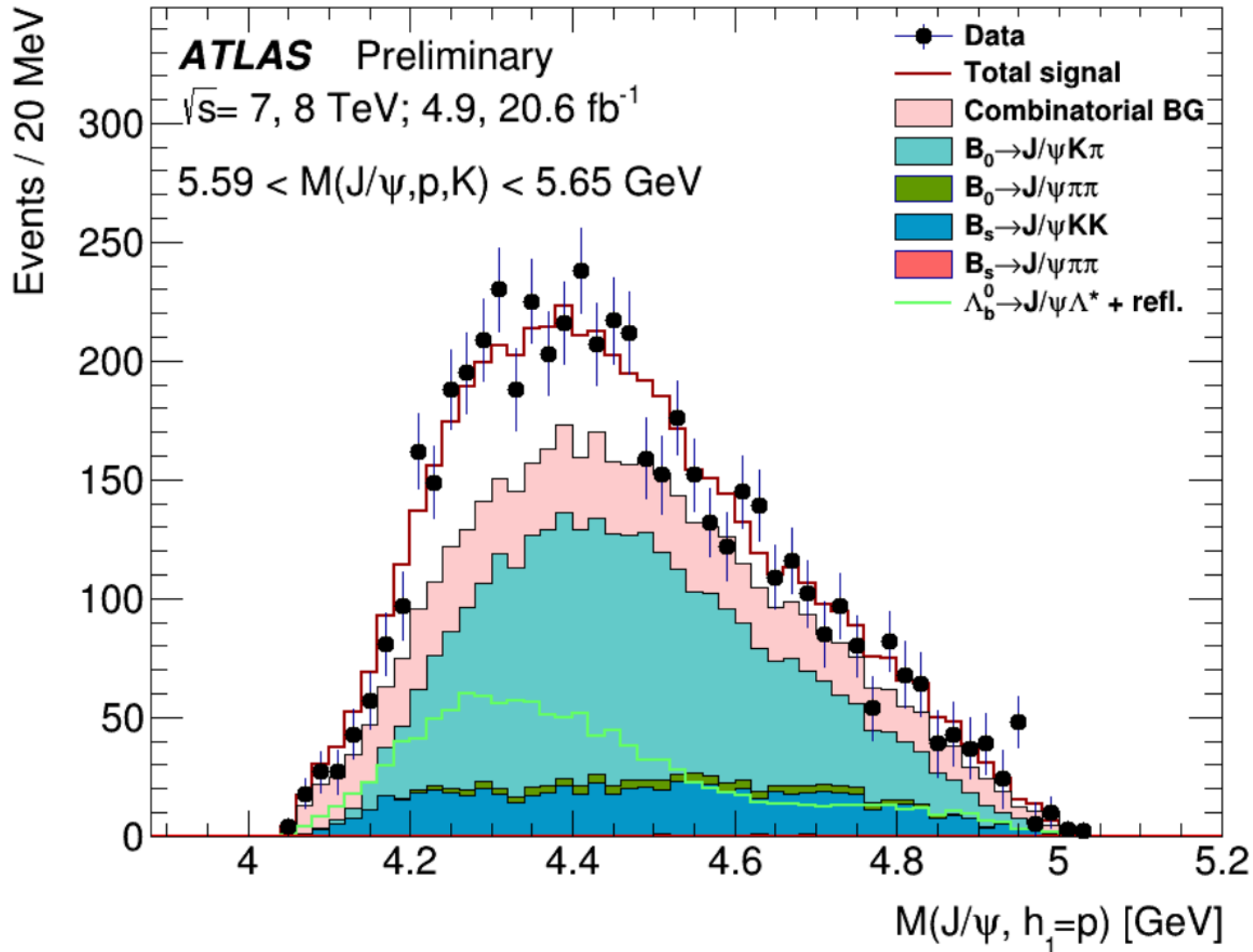
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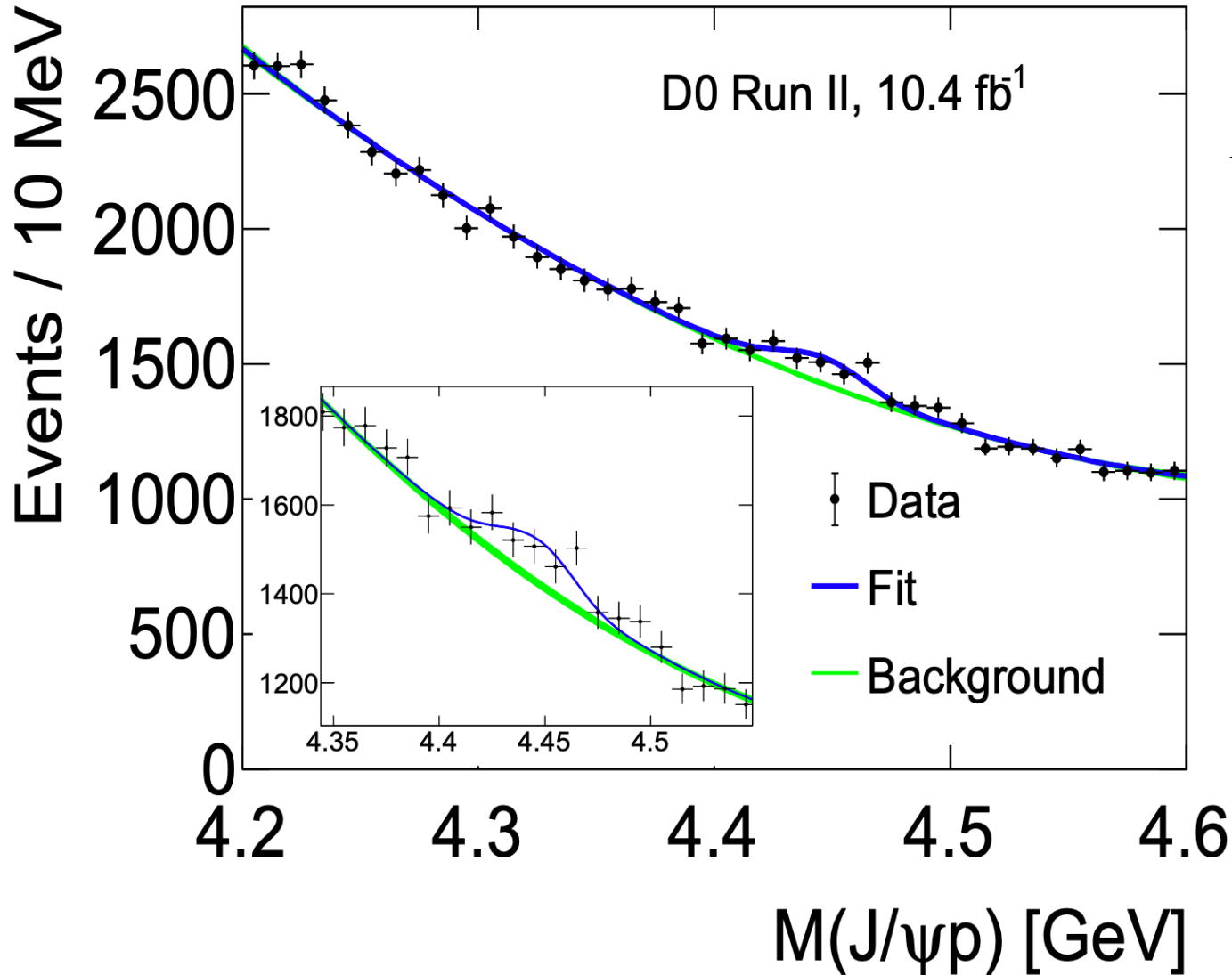
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D0

<https://arxiv.org/pdf/1910.11767.pdf>



$H_b \rightarrow J/\psi p X$

Diffractive photoproduction of J/ψ and Y using holographic QCD: gravitational form factors and GPD of gluons in the proton

Kiminad A. Mamo* and Ismail Zahed

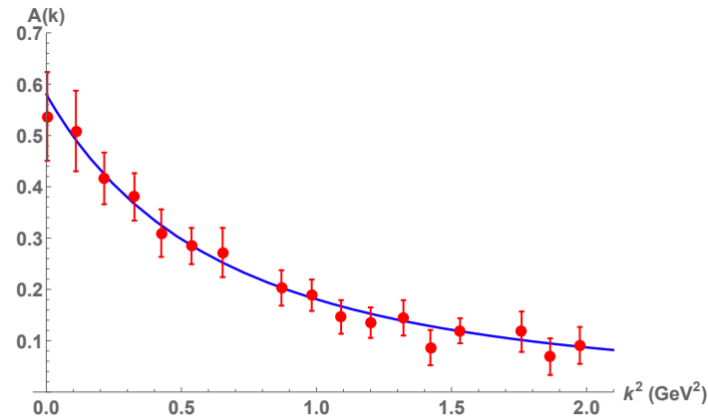
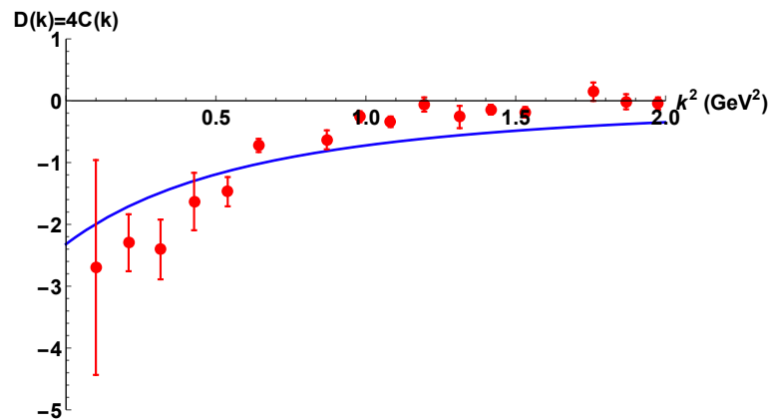
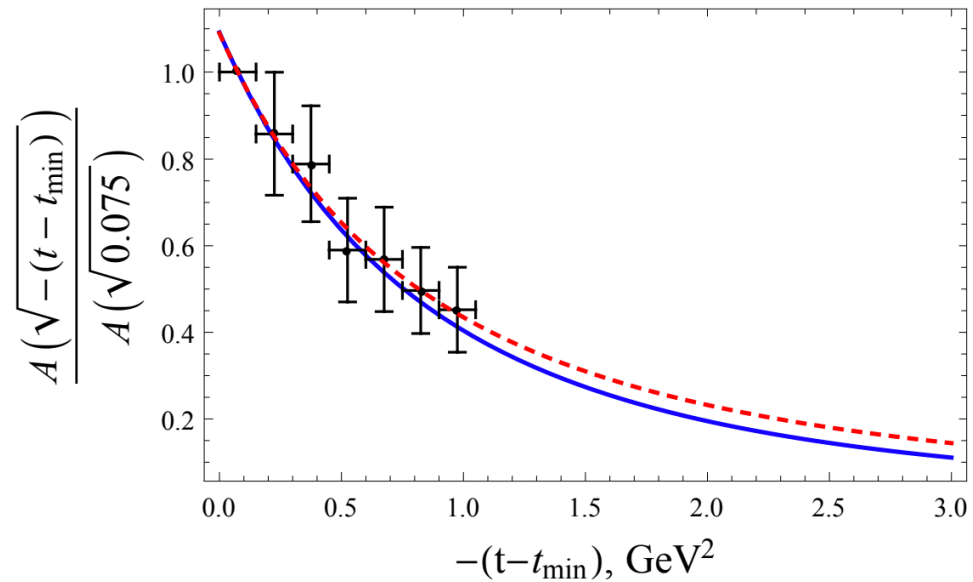
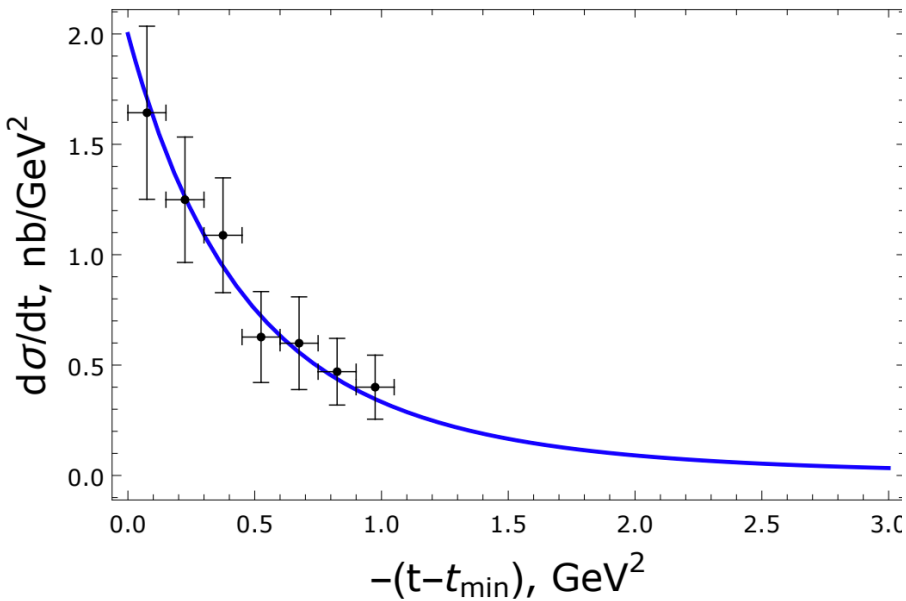


FIG. 5: Holographic gravitational form factor $A(k)$ (for $k^2 \geq 0$) shown in solid-blue curve versus the lattice data in red-squares [26].



Diffraction photoproduction of J/ψ and Y using holographic QCD: gravitational form factors and GPD of gluons in the proton

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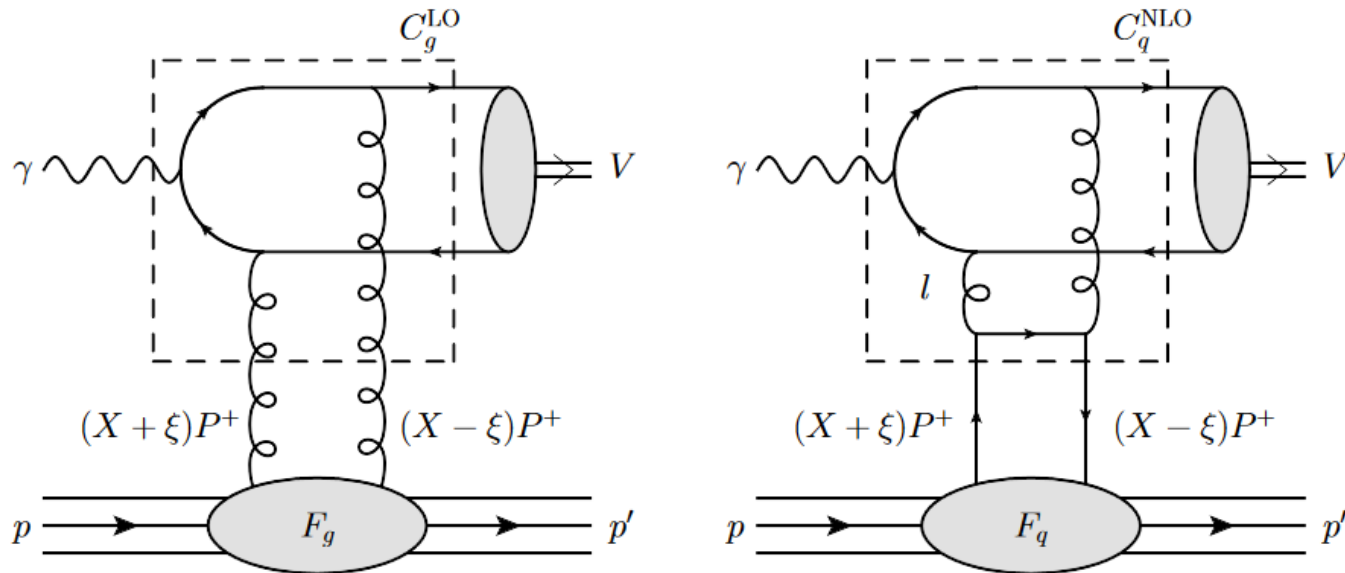


Factorization in exclusive heavy meson photo-production

Ivanov, Schaefer, Szymanowski, Krasnikov, EPJ C34 (2004)

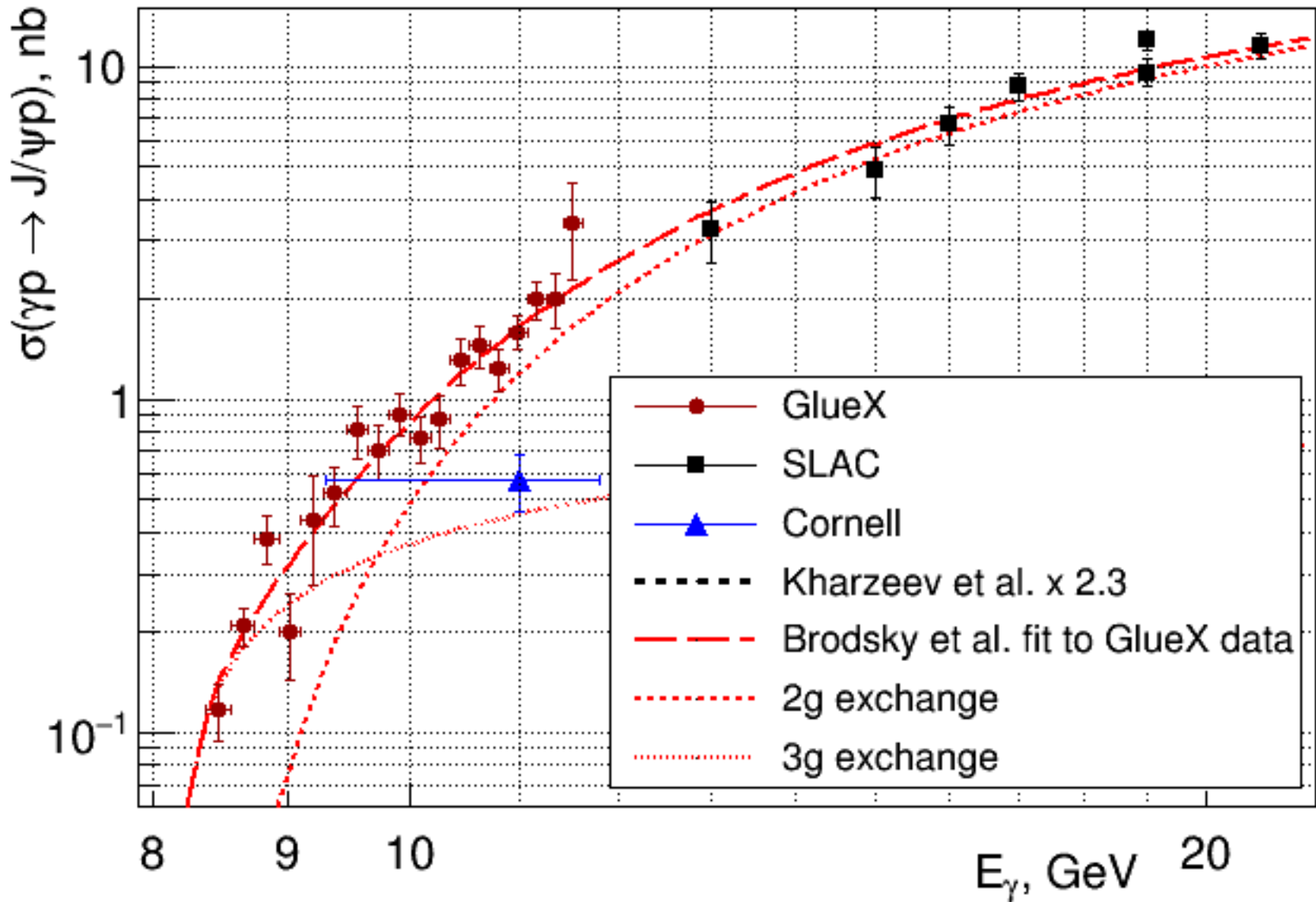
- In contrast, in heavy meson photo-production ($Q^2=0$)
 - the heavy quark mass provides the hard scale: $M \gg \Lambda_{\text{qcd}}$
 - factorization demonstrated explicitly in NLO calculations:

$$A \sim \left(\frac{\langle O \rangle_V}{m_c^3} \right)^{1/2} \int_{-1}^1 [C_g(X, \xi) F_g(X, \xi, t) + C_q(X, \xi) F_q(X, \xi, t)] \frac{dX}{X}$$



However: **not valid in near threshold region** - t must be smaller than m_c ,
 Still can be used as first approximation (Anatoly Radyushkin)

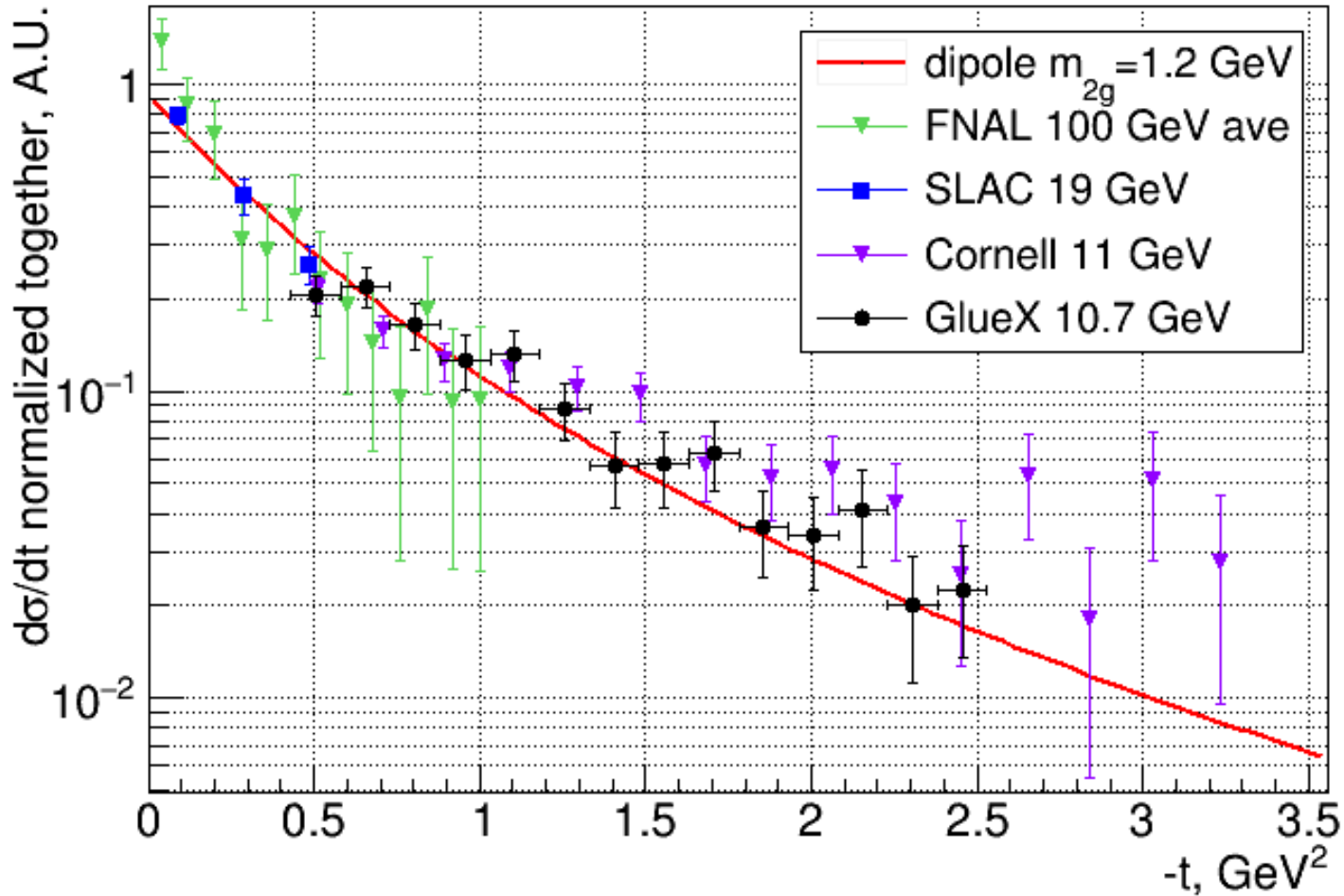
First look at 2018 data: x-sec.



2016+2017+spring 2018

$m_{2g} = 1.2$ GeV used to integrate SLAC data

Proton Gluonic Form Factor



- New fit gives wider distribution:

$$m_{2g} = 1.20 \text{ GeV}$$

compared to

$$m_{2g} = 1.14 \text{ GeV} \text{ before}$$