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Understanding forward particle production

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Opportunities for Drell-Yan Physics at RHIC
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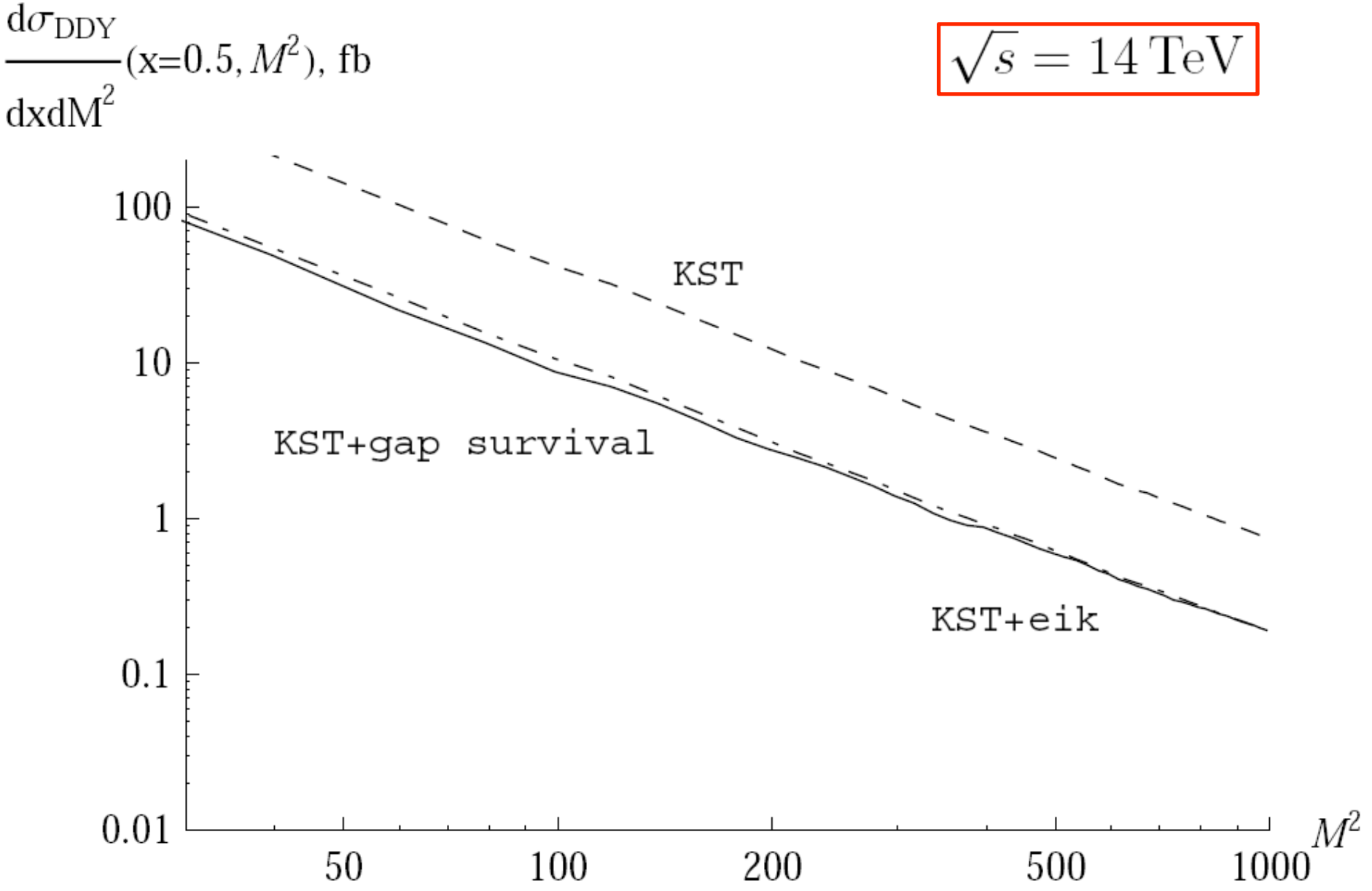
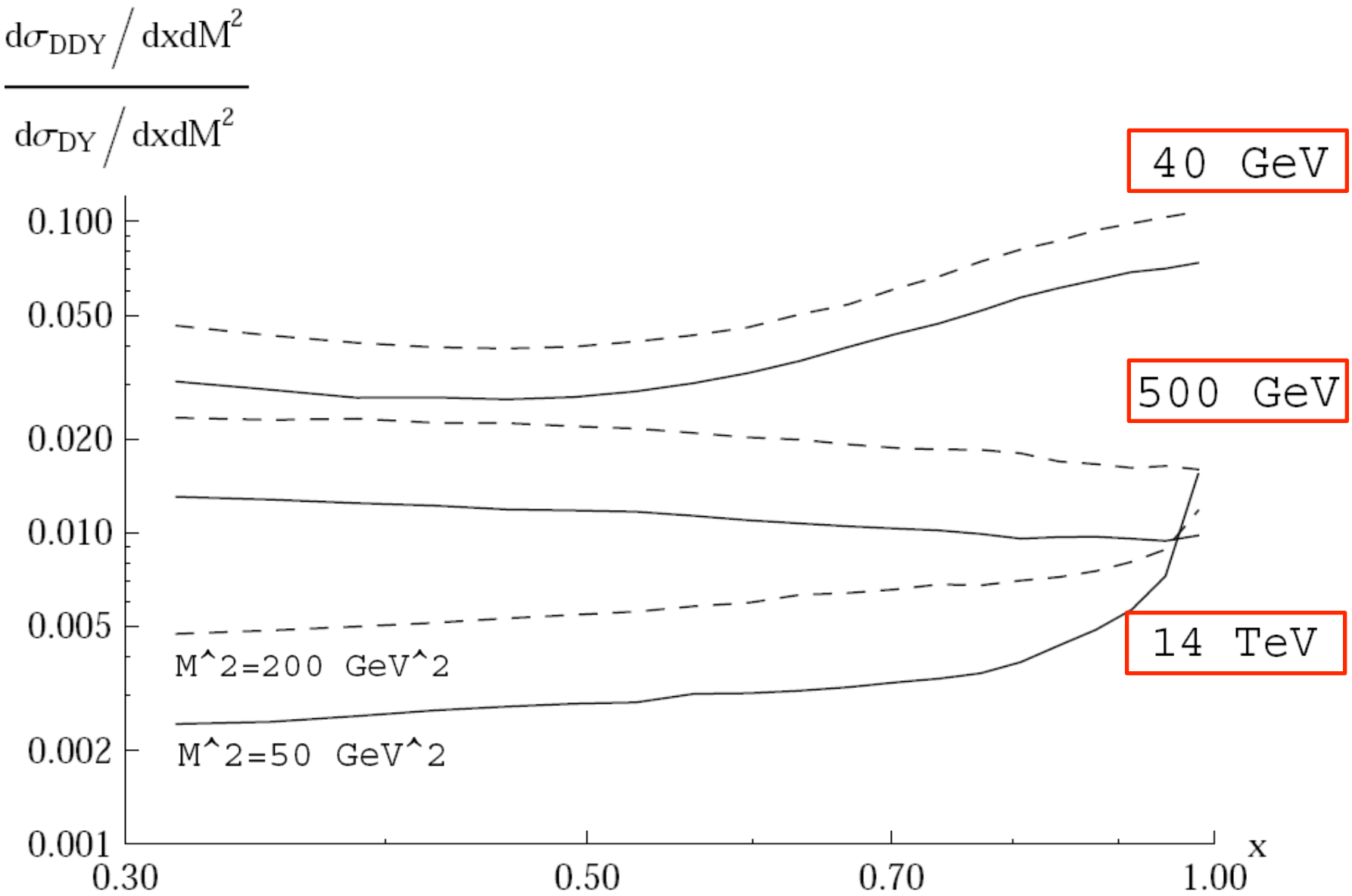
We will talk about...

- Color neutralization and soft physics in diffractive DIS
- Sudakov suppression and elastic scattering
- Drell-Yan at high energies: diffractive vs inclusive
- Large and small dipoles
- Eikonalization of the elastic amplitude and gap survival
- Summary

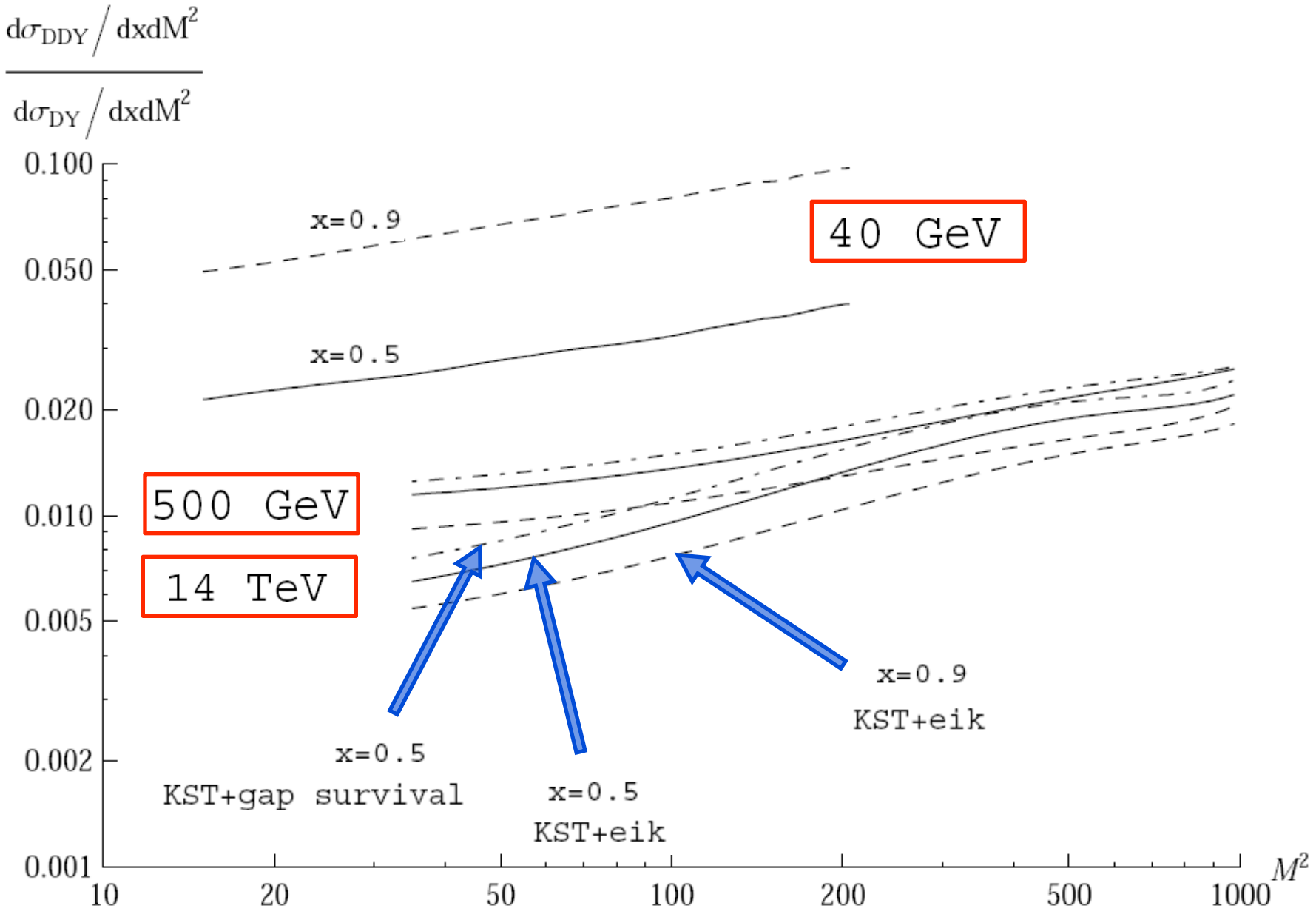
Gap survival vs. eikonalization



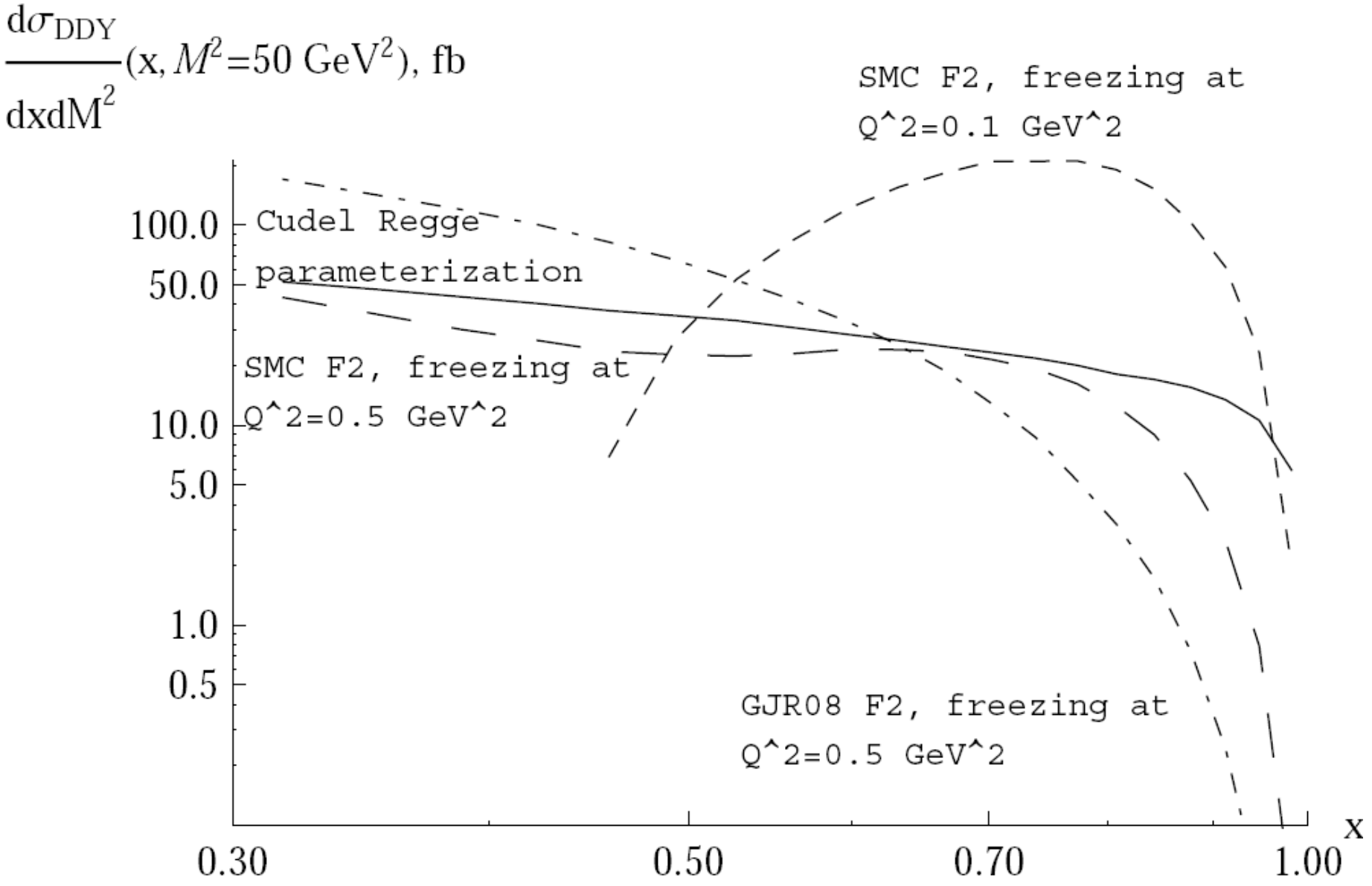
Diffractive vs. inclusive DY



Diffractive vs. inclusive DY



Theory uncertainties



Conclusions

- A quark **cannot radiate** photon diffractively in the forward direction
- A hadron can radiate photon diffractively in the forward direction because of **the transverse motion of quarks**
- The ratio diffractive/inclusive DY cross sections falls with energy and rises with photon dilepton mass due to **the saturated shape** of the dipole cross section
- Hard and soft interactions contribute to the DDY on the same footing, which is **the dramatic breakdown of the QCD factorisation**
- Main features of Drell-Yan diffraction are valid for other **Abelian processes**
- Experimental measurements of DDY would allow to probe directly the dipole cross section **at large separations**, as well **as the proton structure** function at soft and semihard scales, and large x
- DDY is a good playground for **diffractive production of heavy flavors**