

DEEPLY VIRTUAL MESON PRODUCTION

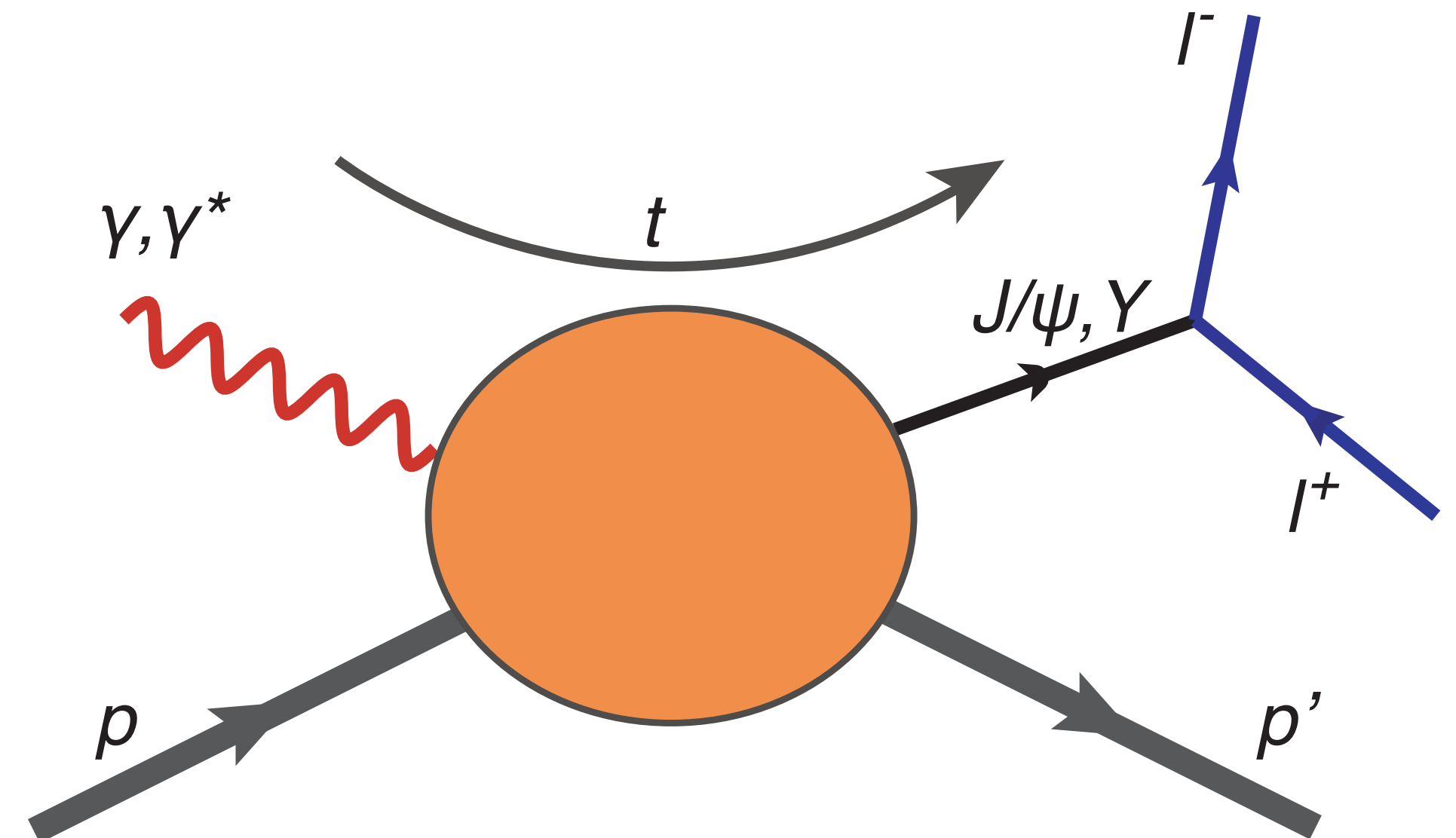
Exclusive electro-production of vector mesons (focussed around J/ψ)

Electro-Production at high energies:

- **Access Gluon GPD:** Full 3D tomography of the gluonic structure of the nucleon
- **Matter radius** of nuclei
- L-T Separation and Q^2 dependence of R for quarkonium production

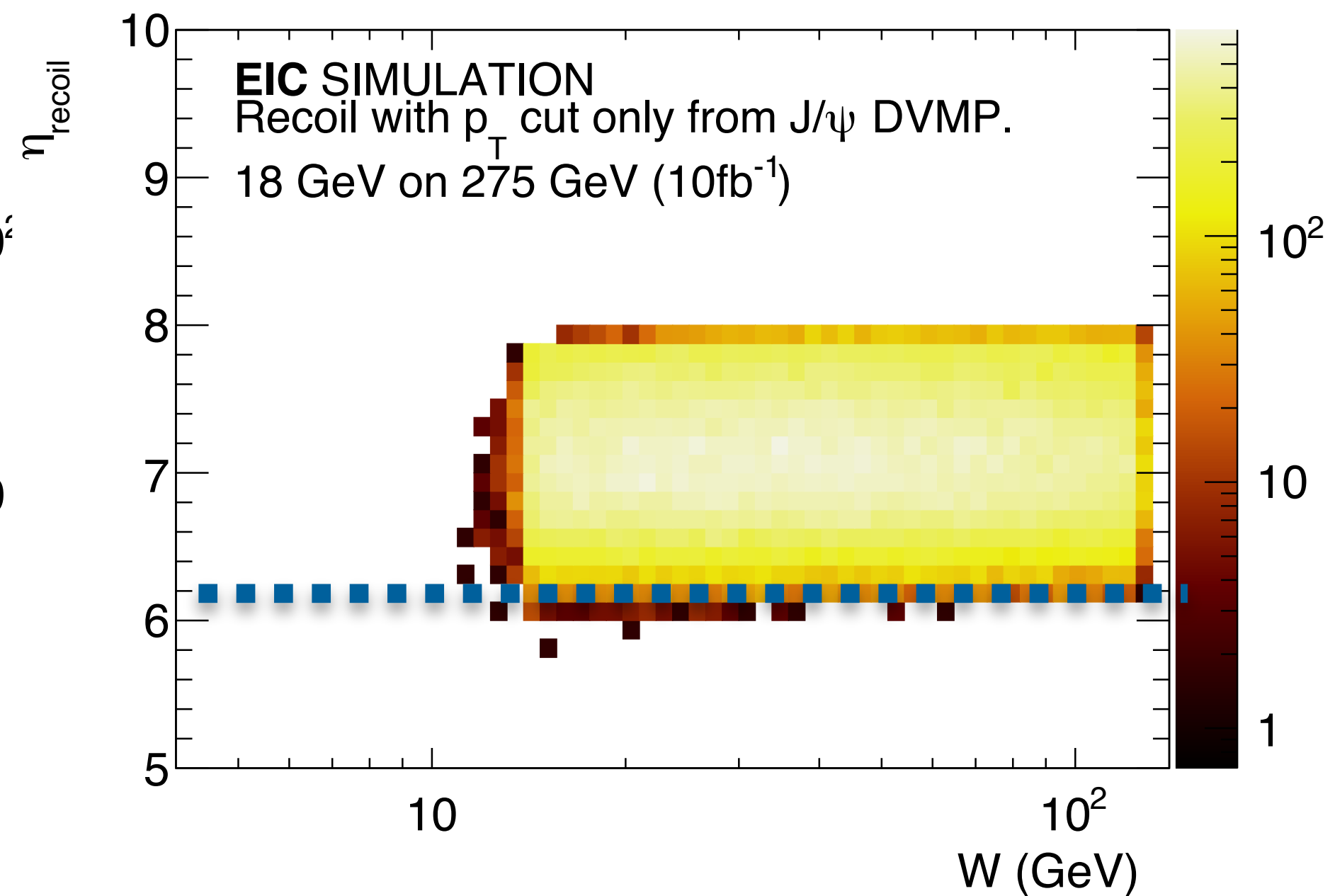
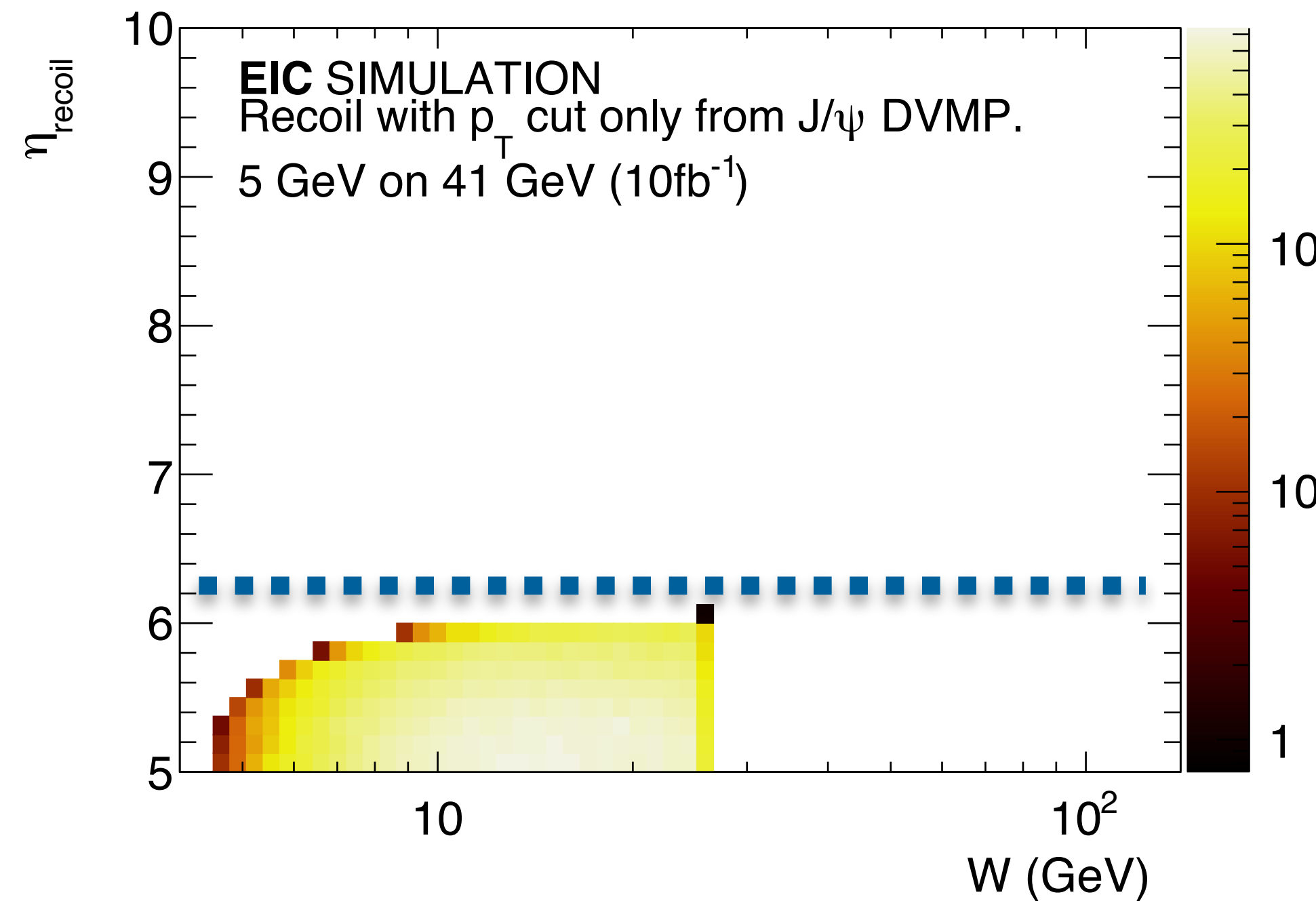
Near Threshold:

- **Origin of proton mass**, trace anomaly of the QCD EMT
- **Gluonic Van der Waals force**, possible quarkonium-nucleon/nucleus bound states
- **Mechanism** for quarkonium production



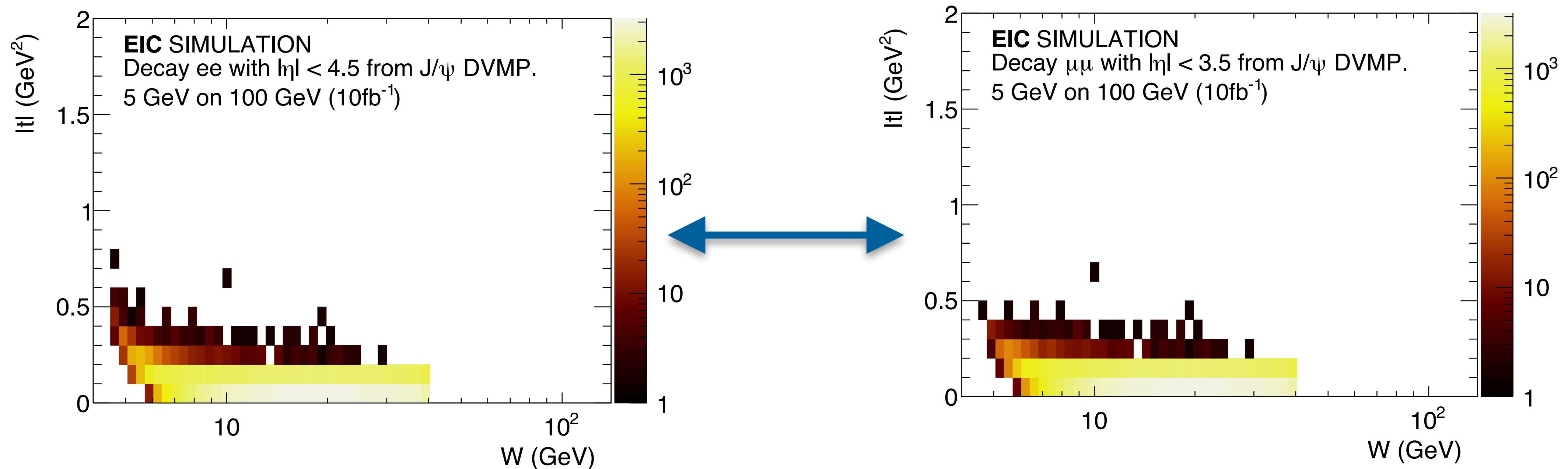
SENSITIVITY TO RECOIL TAGGING

- Need more sophisticated approach than handbook (which would make recoil tagging impossible for low-energy operations!)
- Recoil acceptance disproportionately impacts the threshold region and high- t regions

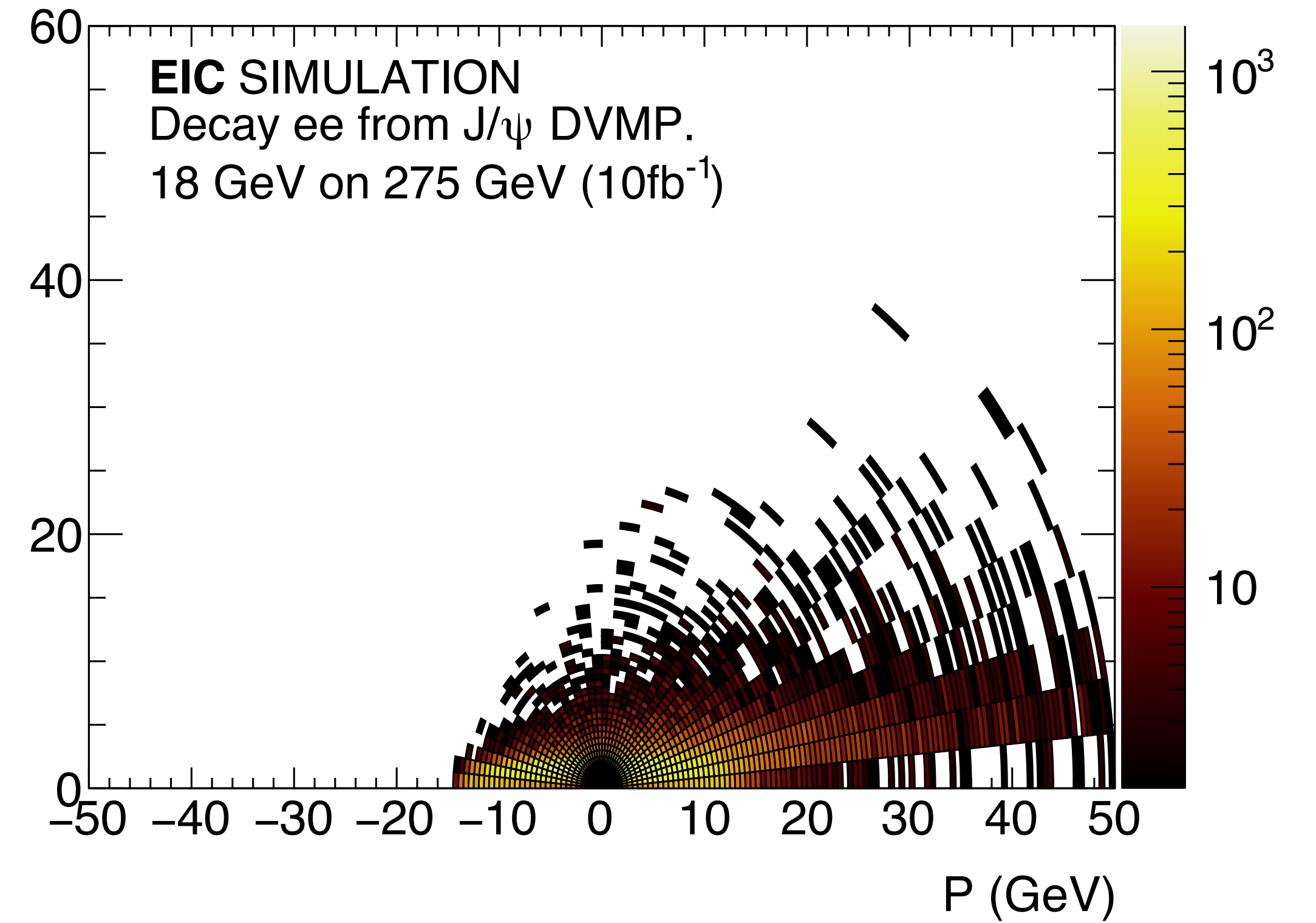
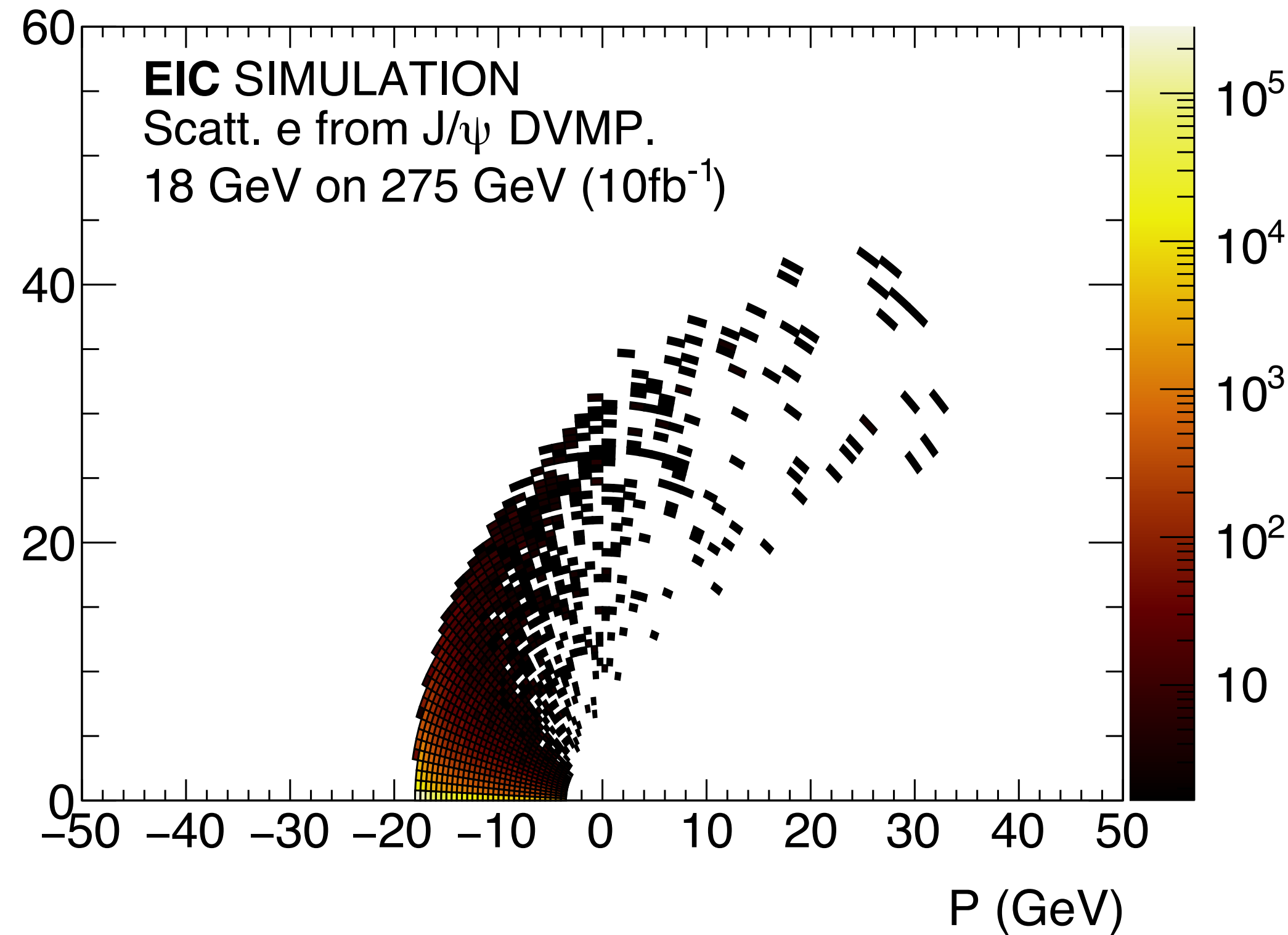


CONTROL BACKGROUND THROUGH MUON CHANNEL?

- Currently being evaluated using GRAPE-dilepton
- Assuming muon detection in tracker only minor drop in statistics
- However threshold measurements harder
- Extra muon detection in $3.5 < \eta < 4.5$ would be nice



ELECTRON ACCEPTANCE SUFFICIENT



BRAND NEW WORK ON UPSILON PRODUCTION AT EIC!

<https://arxiv.org/abs/2005.09293>

Υ photo-production on the proton at the Electron-Ion Collider

Oleksii Gryniuk,¹ Sylvester Joosten,² Zein-Eddine Meziani,² and Marc Vanderhaeghen¹

¹*Institut für Kernphysik & PRISMA⁺ Cluster of Excellence,
Johannes Gutenberg Universität, D-55099 Mainz, Germany*

²*Argonne National Laboratory, Lemont, IL 60439, USA*

(Dated: May 20, 2020)

We present a dispersive analysis with the aim to extract the Υ -p scattering length from $\gamma p \rightarrow \Upsilon p$ experiments. In this framework, the imaginary part of the Υ -p forward scattering amplitude is obtained from $\gamma p \rightarrow \Upsilon p$ cross section measurements, and is constrained at high energies from existing HERA and LHC data. Its real part is calculated through a once-subtracted dispersion relation, and the subtraction constant is proportional to the Υ -p scattering length. We perform a feasibility study for Υ photo-production experiments at an Electron-Ion Collider and discuss the sensitivity and precision that can be reached in the extraction of the Υ -p scattering length.