

# DVCS and DVMP $\pi^0$ kinematics

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Exclusive/YR meeting, 14/08/2020

# Motivation

We show kinematics plots for DVCS and DVMP  $\pi^0$  to be used in detector studies

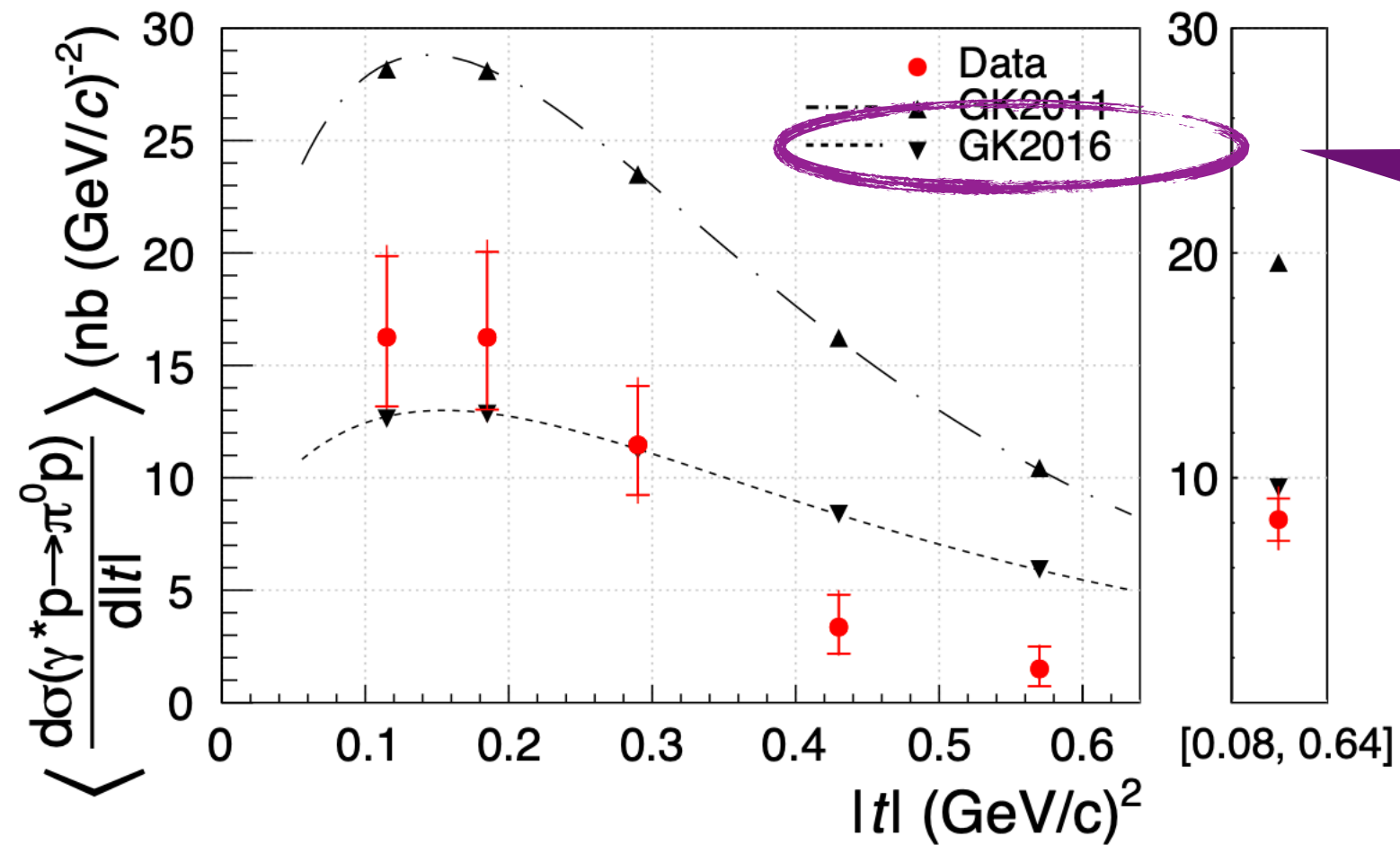
Of course, not all possible plots are shown here → contact us for more plots, different scales, representations, etc.

Significant change for DVMP  $\pi^0$  w.r.t. 10/07 talk. The old plots did not include contributions coming from transversity GPDs

# Total cross-sections and details of analysis

Electron beam energy [GeV]	Proton beam energy [GeV]	Integrated luminosity [fb <sup>-1</sup> ]	DVCS integrated x-sec. [nb]	DVCS nb. of events	DVMP $\pi^0$ integrated x-sec. [nb]	DVMP $\pi^0$ nb. of events
5	41	10	0.53	5.3e+06	2.4	2.4e+07
5	100	10	0.64	6.4e+06	2.4	2.4e+07
10	100	10	0.74	7.4e+06	2.4	2.4e+07
18	275	10	0.95	9.5e+06	2.4	2.4e+07

COMPASS, Phys. Lett. B 805 (2020) 135454

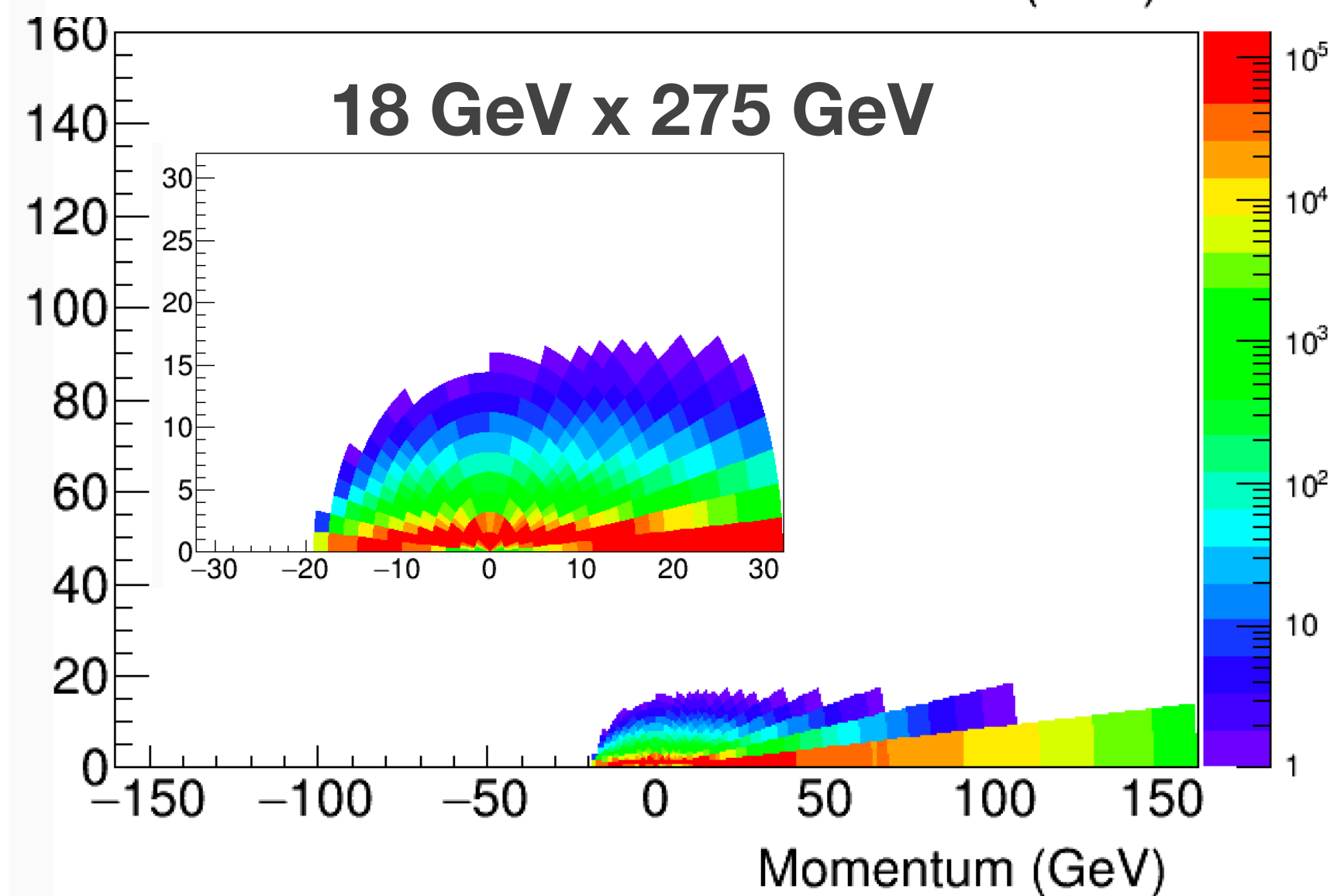
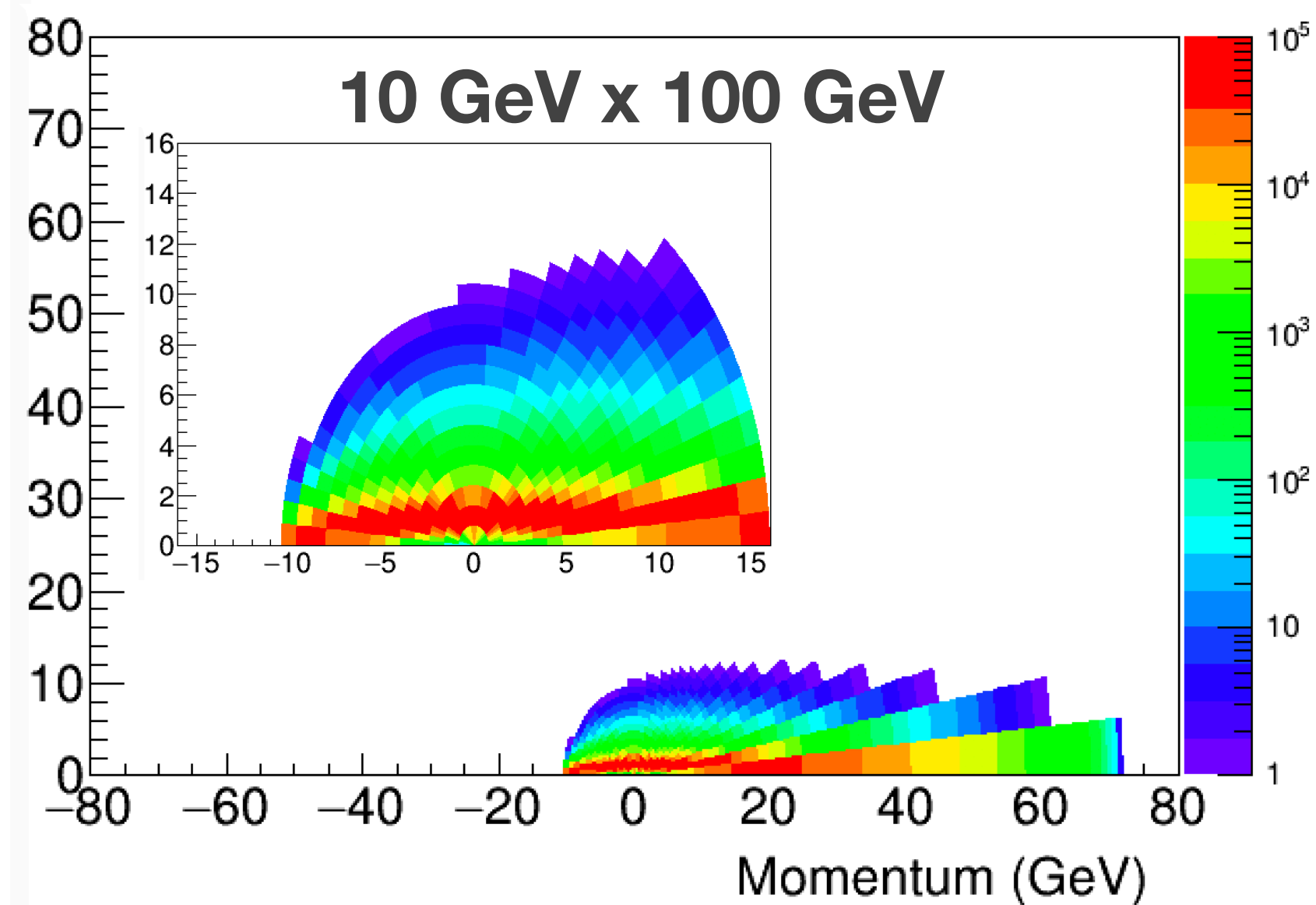
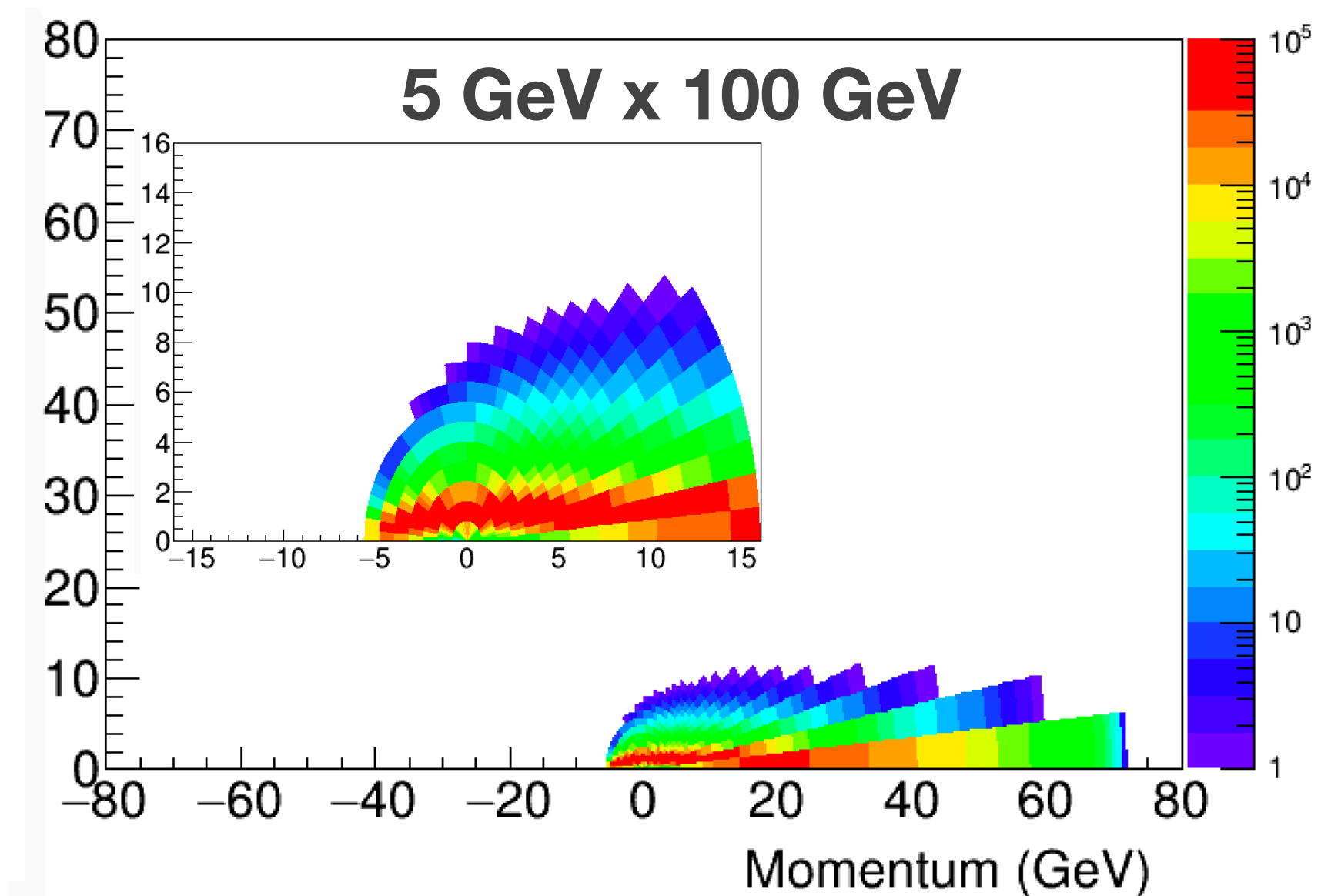
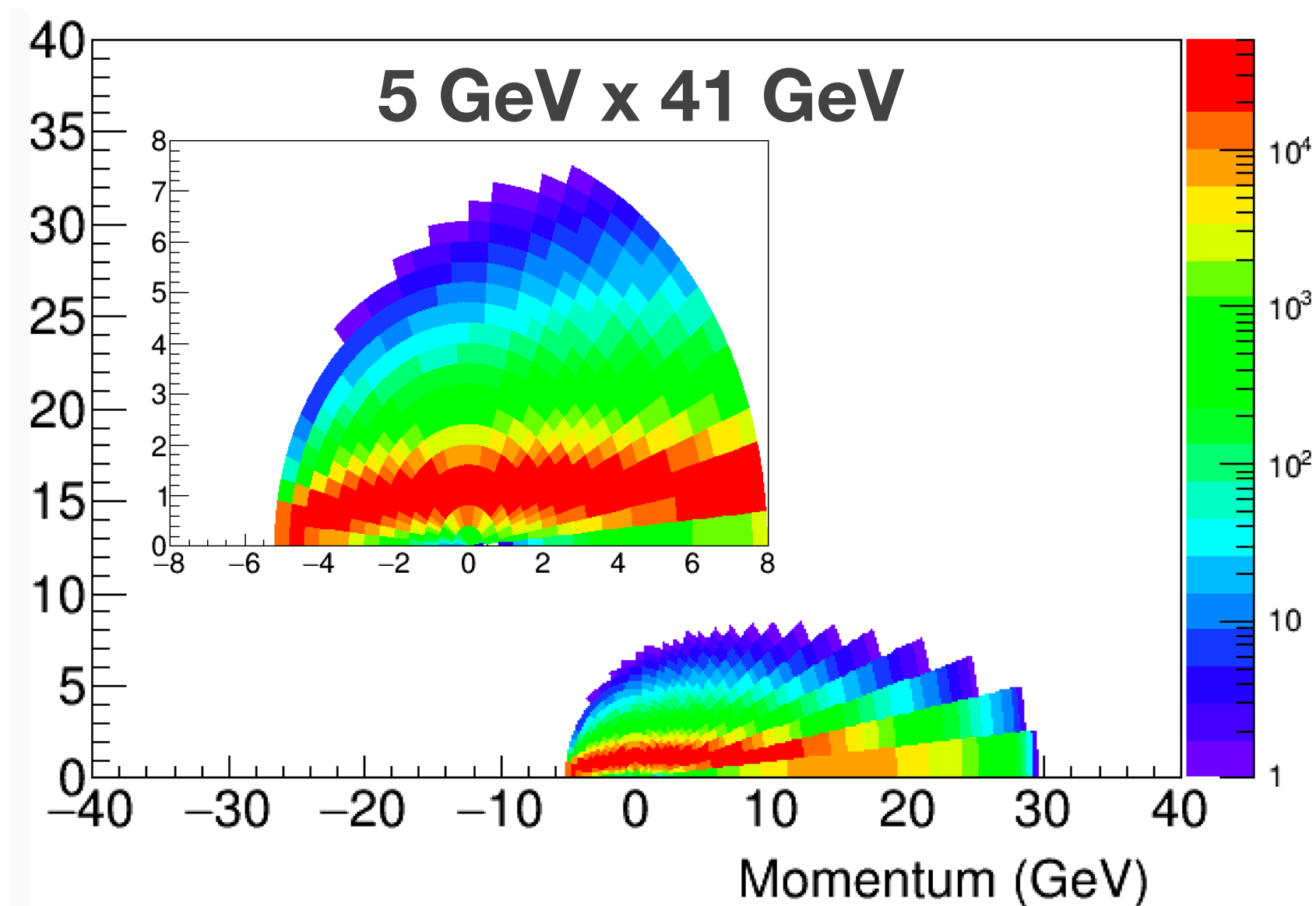


for:  $5 \cdot 10^{-5} < x_B < 0.7$ ,  $1 \text{ GeV}^2 < Q^2 < 1000 \text{ GeV}^2$ ,  $0 < |t| < 1.6 \text{ GeV}^2$   
GK GPD model

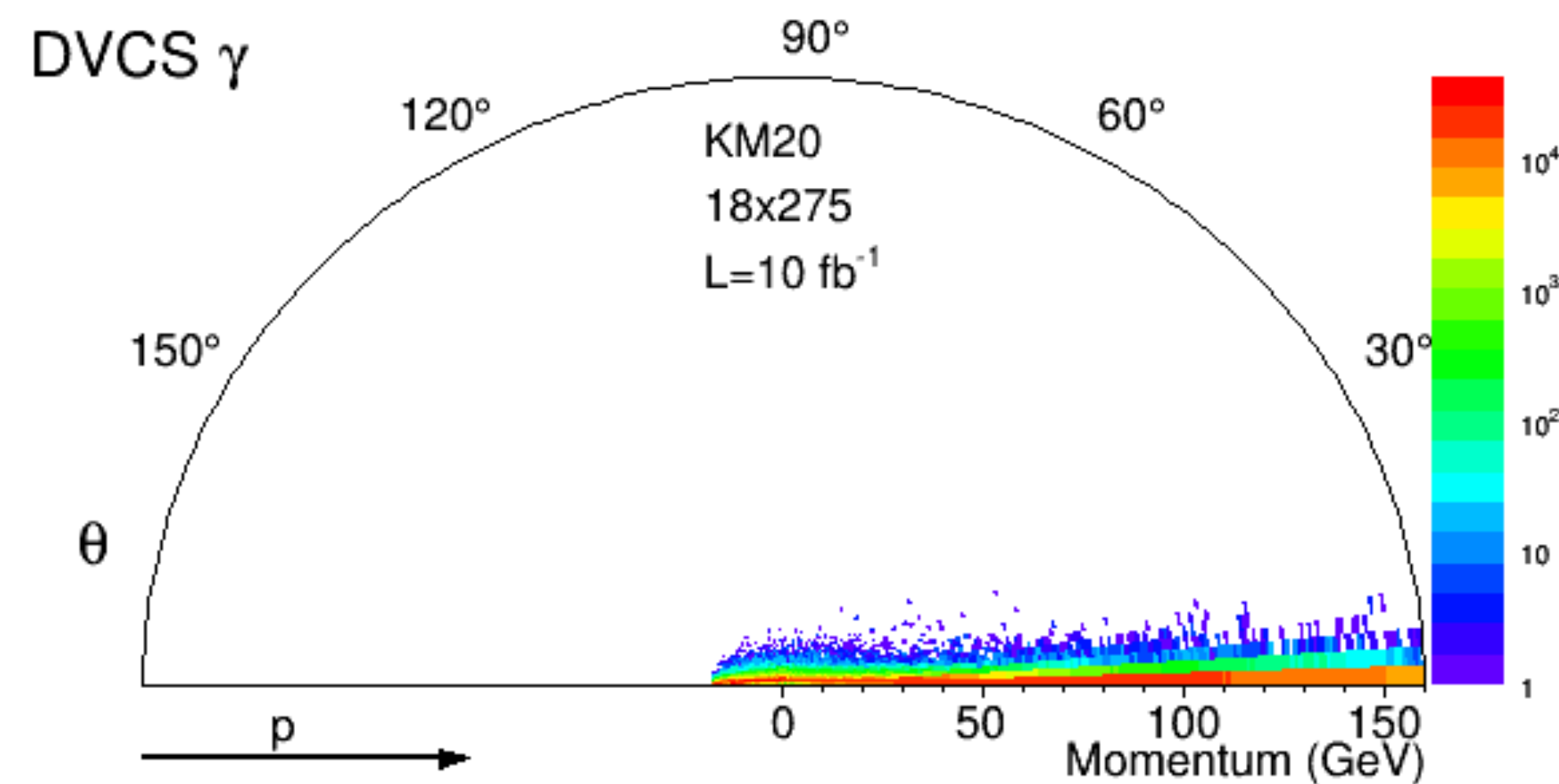
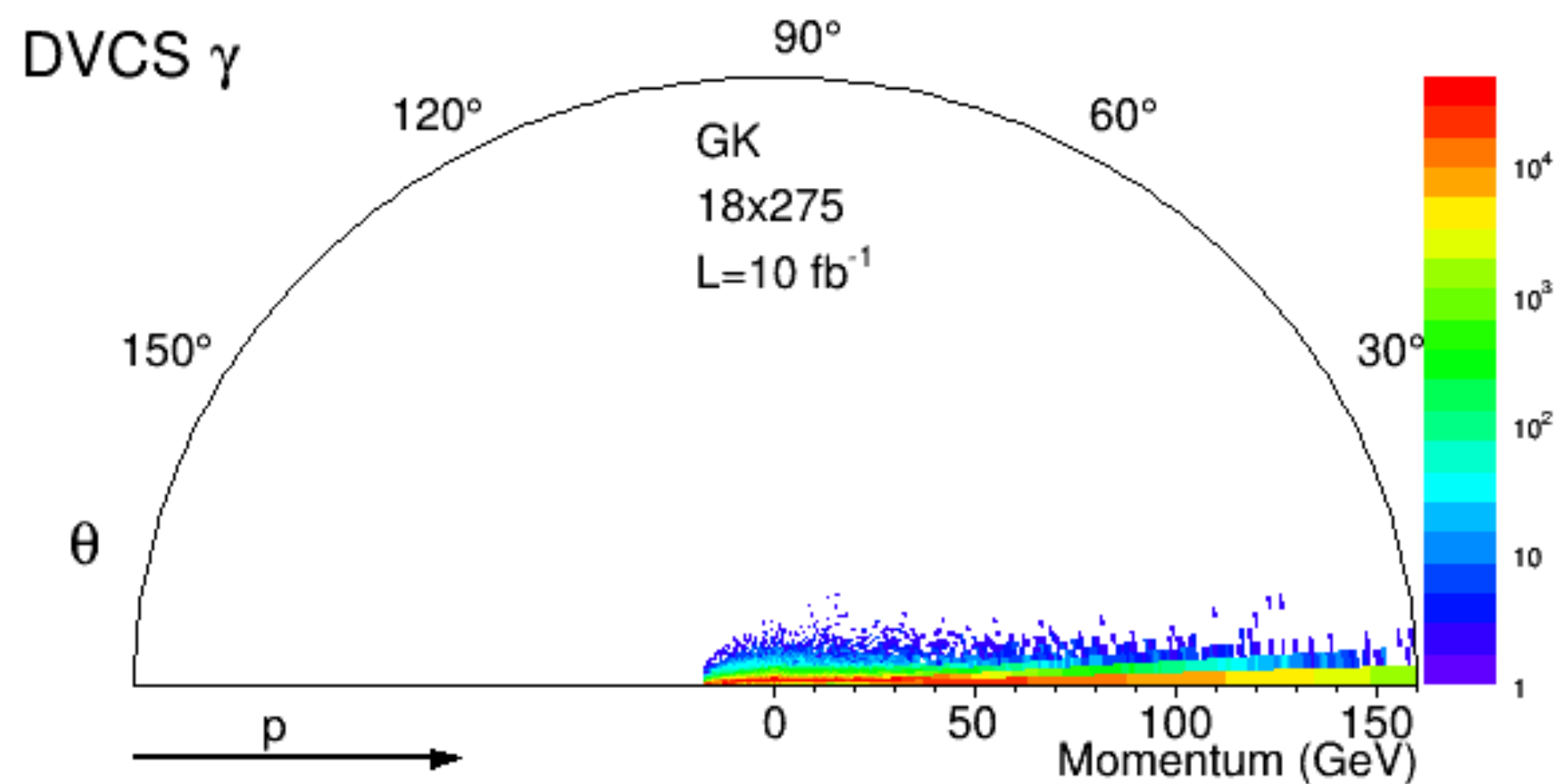
tables of cross-sections produced with PARTONS and used in toy MC generator

DVMP  $\pi^0$  description of amplitudes in GK framework  
implemented in PARTONS by Kemal Tezgin, see talk on June, 12th

# YR plots - DVCS $\gamma$ (mind various scales)

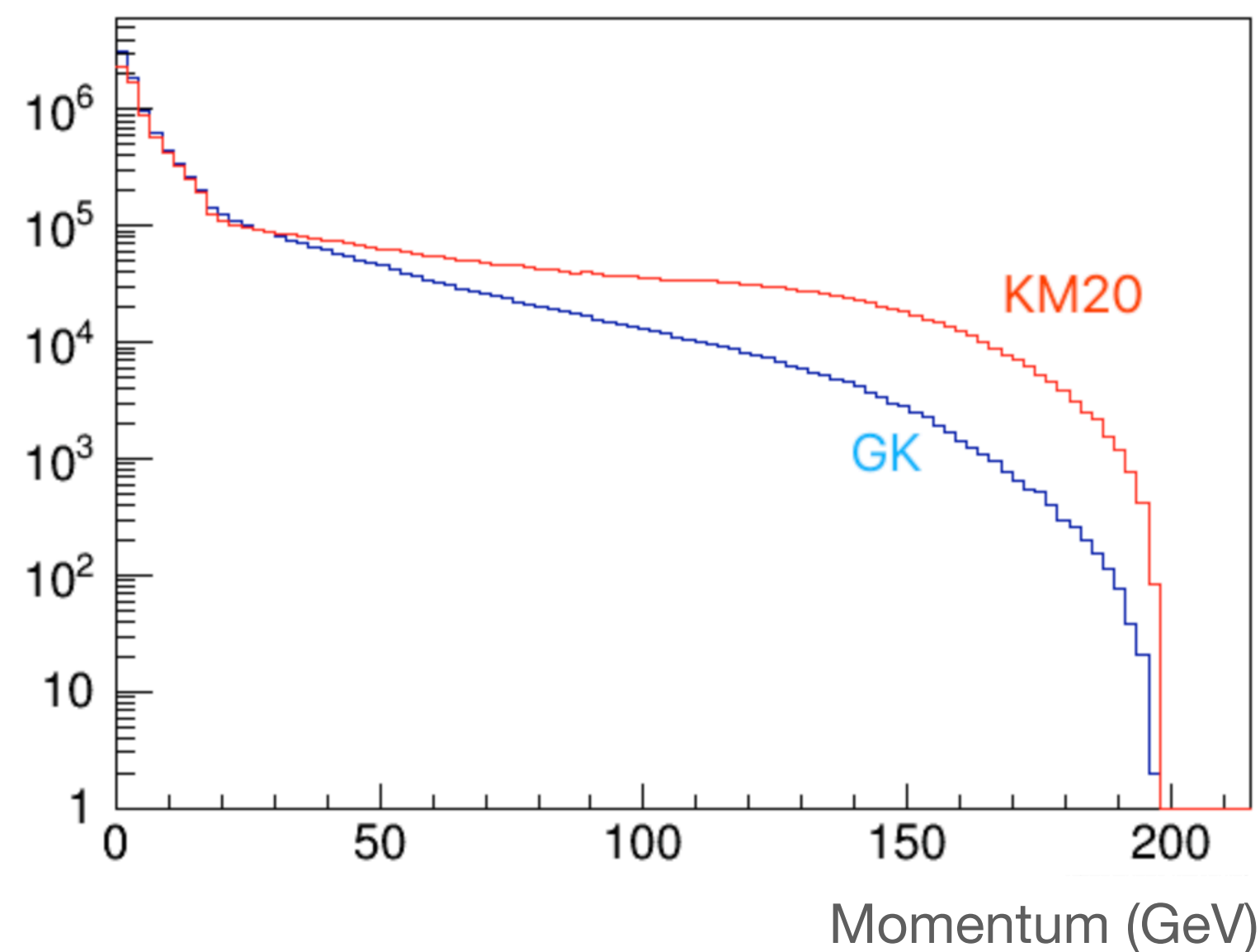


# YR plots - DVCS $\gamma$



plots from sample generated with MILOU  
by Jinlong Zhang

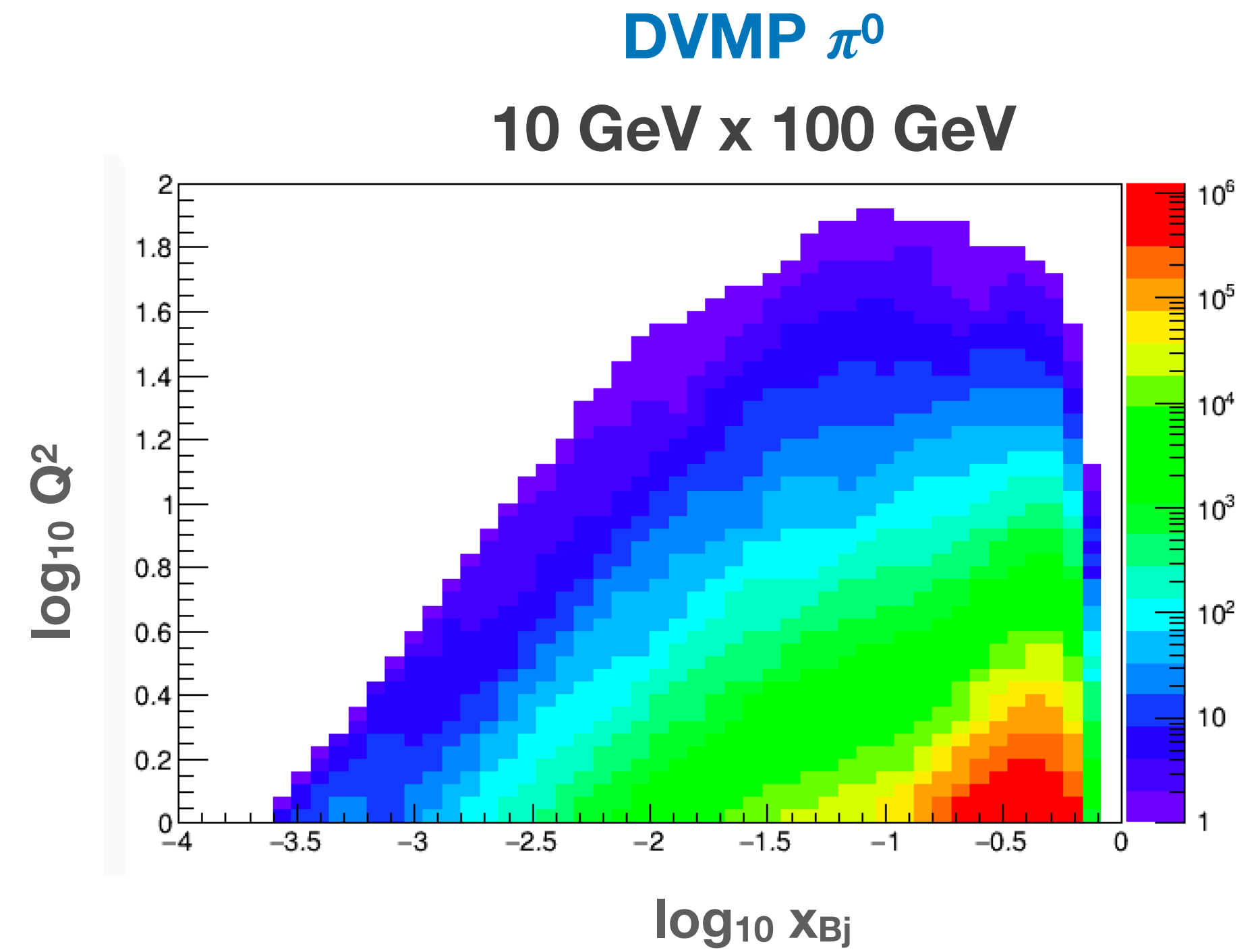
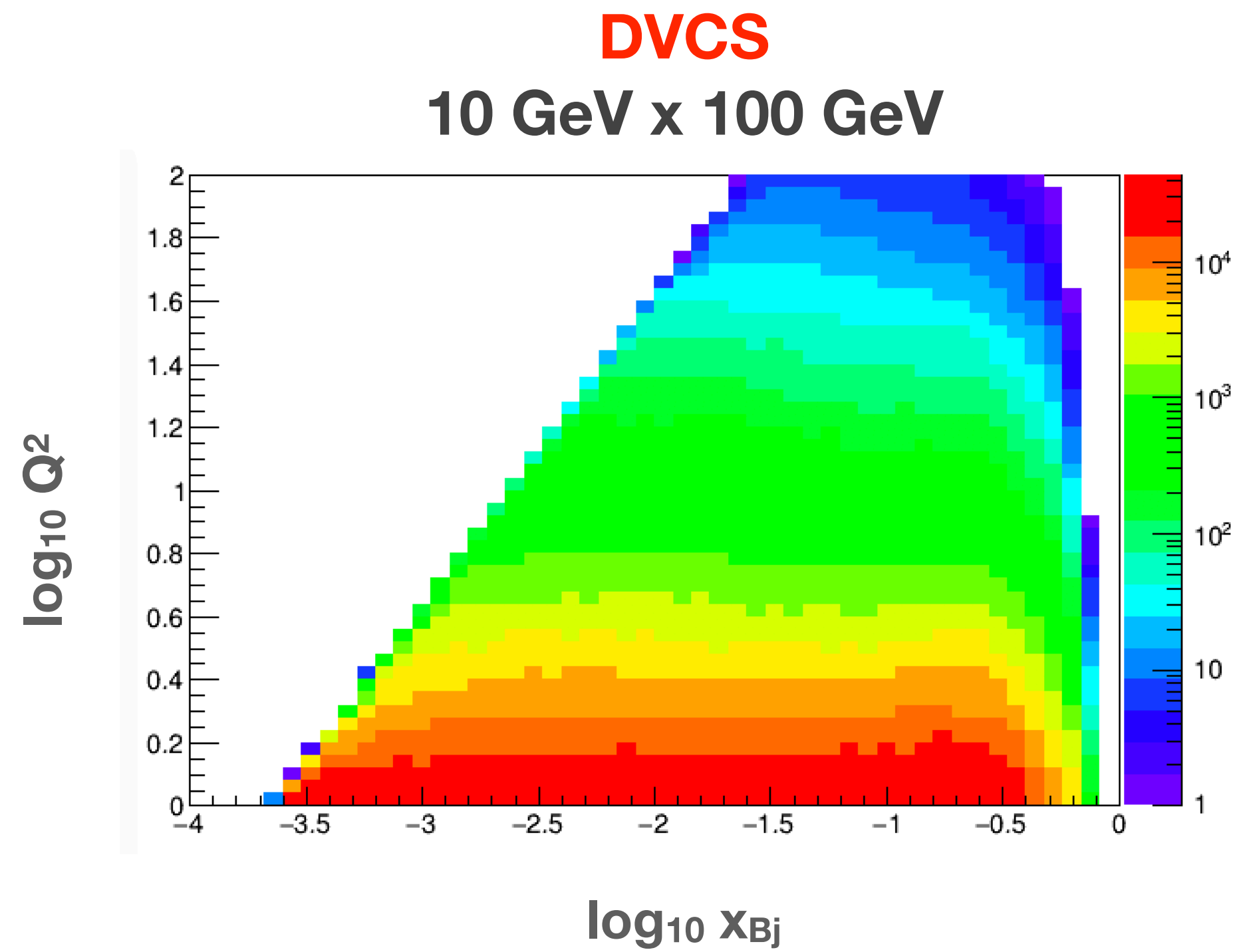
KM20 tables from Kresimir Kumerički



significant difference between two models in the tail, but should not affect too much detector studies

difference under investigation  
→ Salvatore Fazio

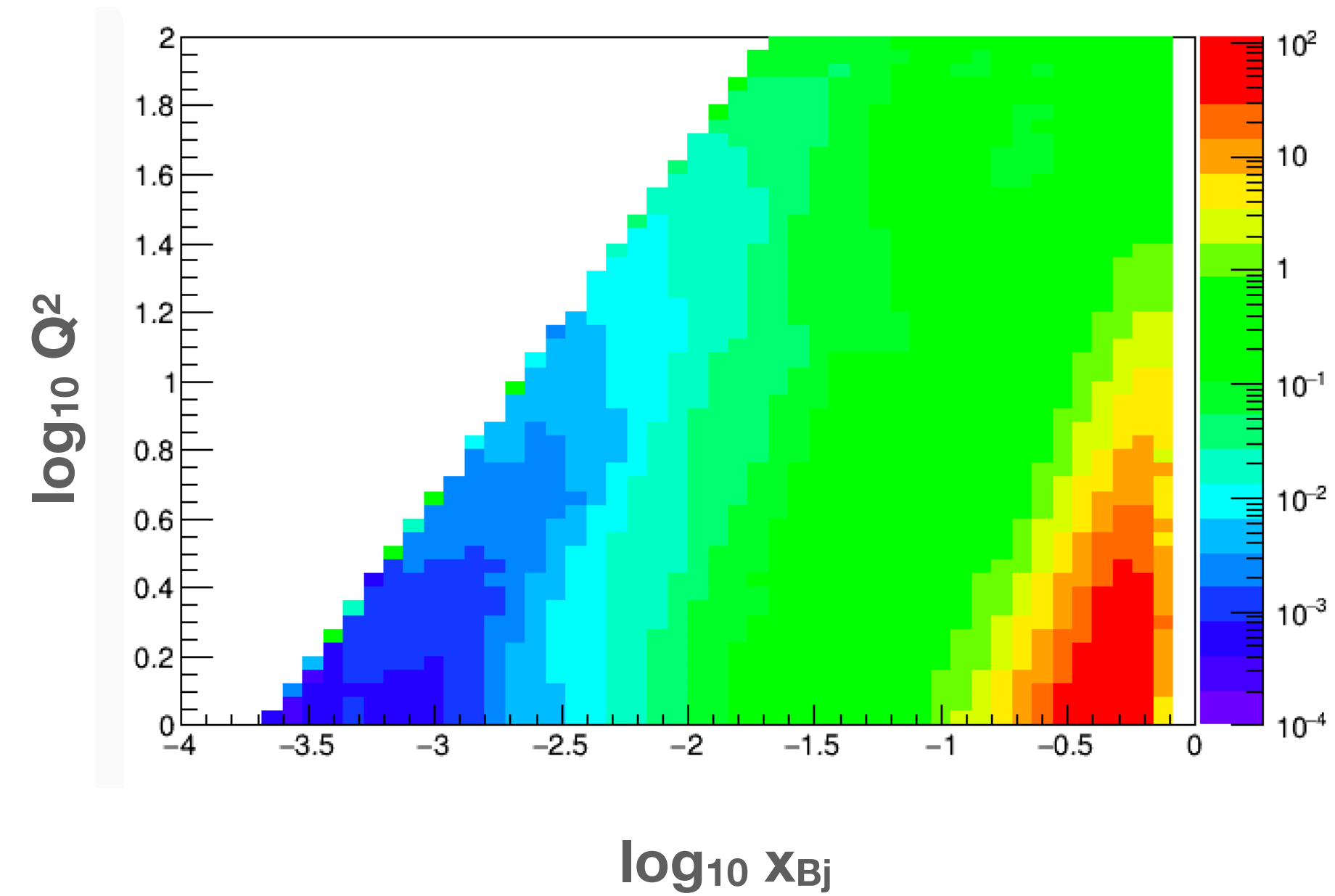
# Yields as function of $x_{Bj}$ vs. $Q^2$



# Yields as function of $x_{Bj}$ vs. $Q^2$

DVMP  $\pi^0$  / DVCS

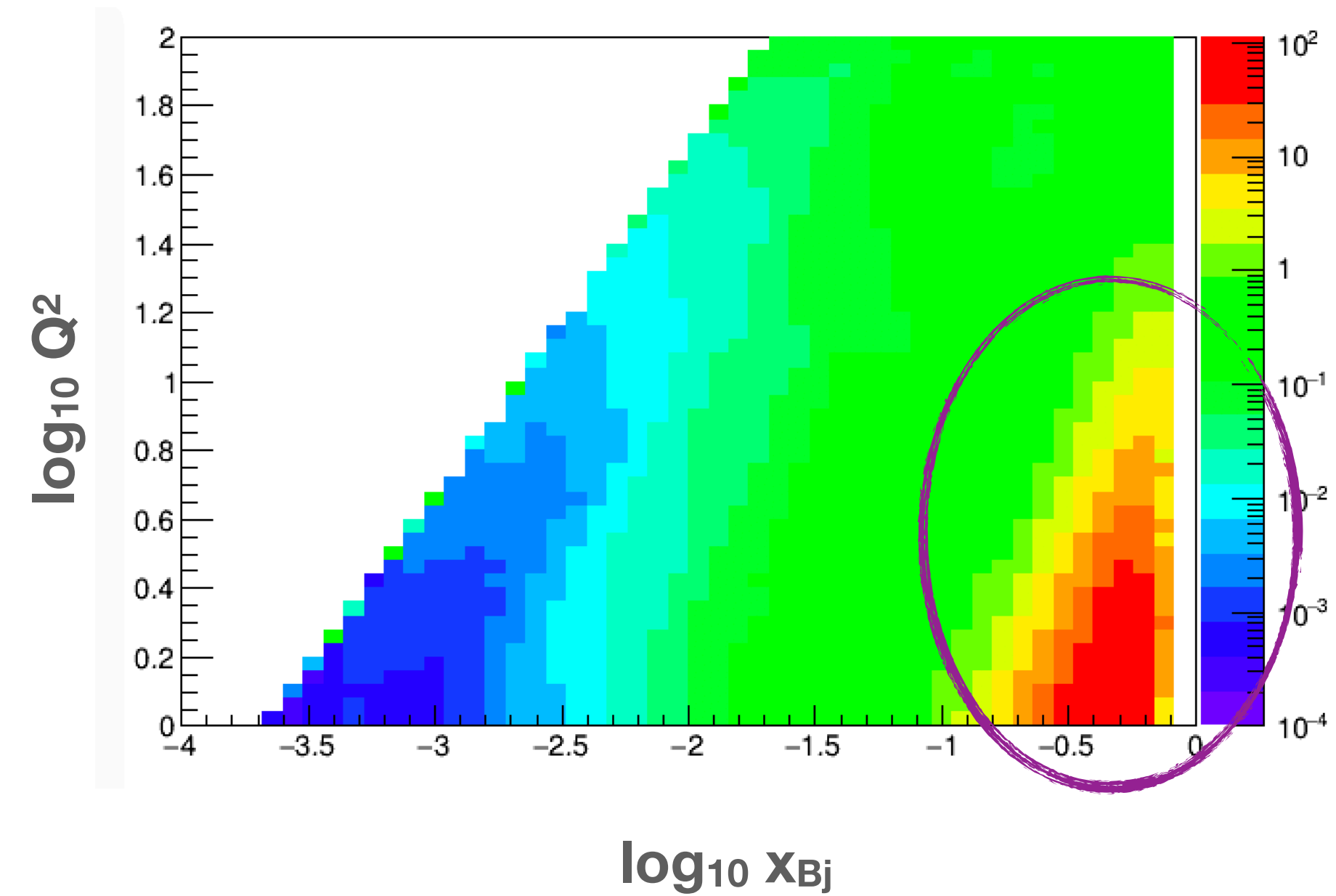
10 GeV x 100 GeV



# Yields as function of $x_{Bj}$ vs. $Q^2$

DVMP  $\pi^0$  / DVCS

10 GeV x 100 GeV

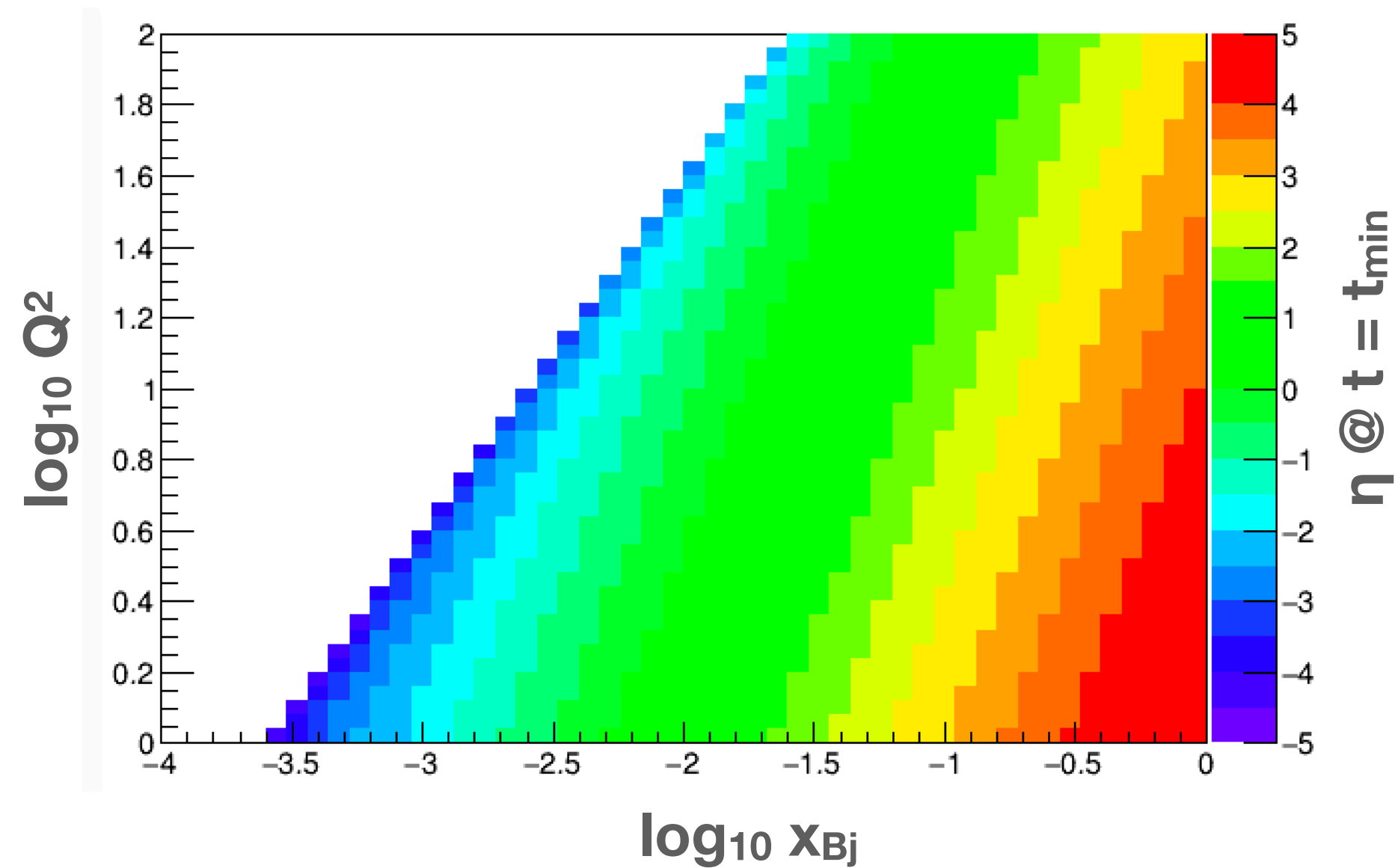


here,  $\pi^0$  possible source of bkg. to DVCS due to insufficient ECAL granularity or acceptance

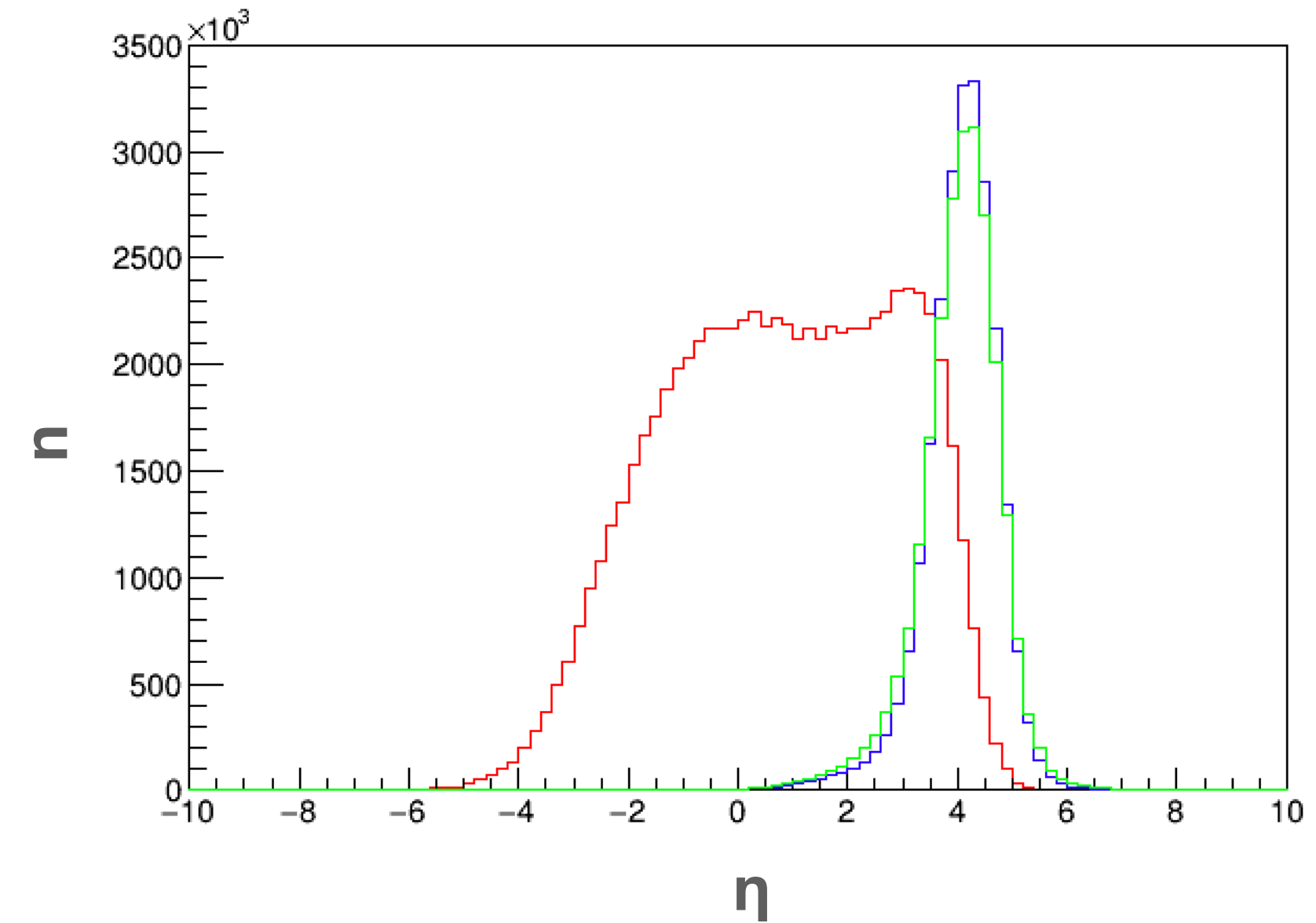


# Yields as function of pseudo-rapidity

$\eta$  of exclusive particle as function of  $(x_{Bj}, Q^2, t=t_{min})$   
approx. the same for DVCS and DVMP  $\pi^0$   
10 GeV x 100 GeV



Yields  
10 GeV x 100 GeV

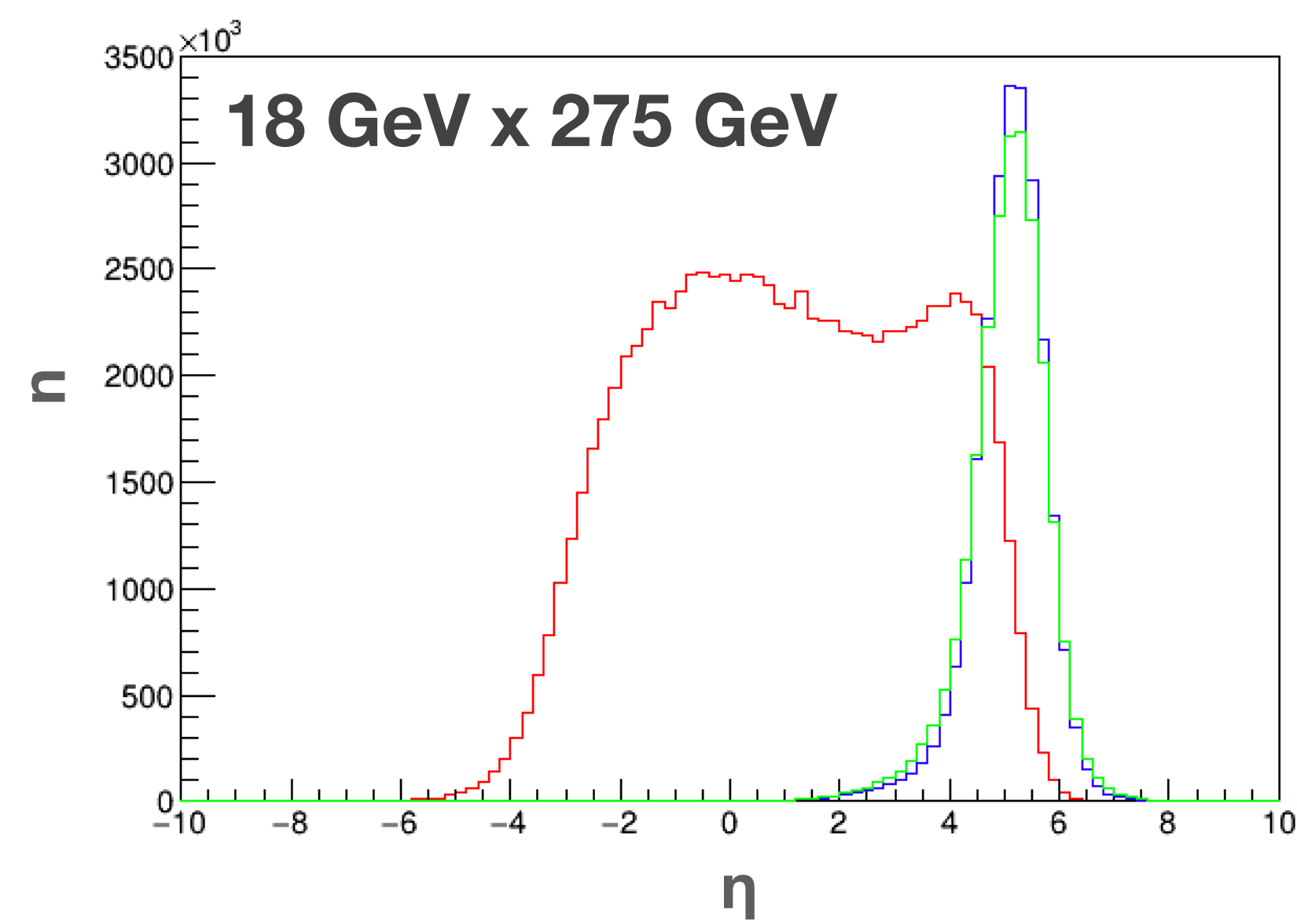
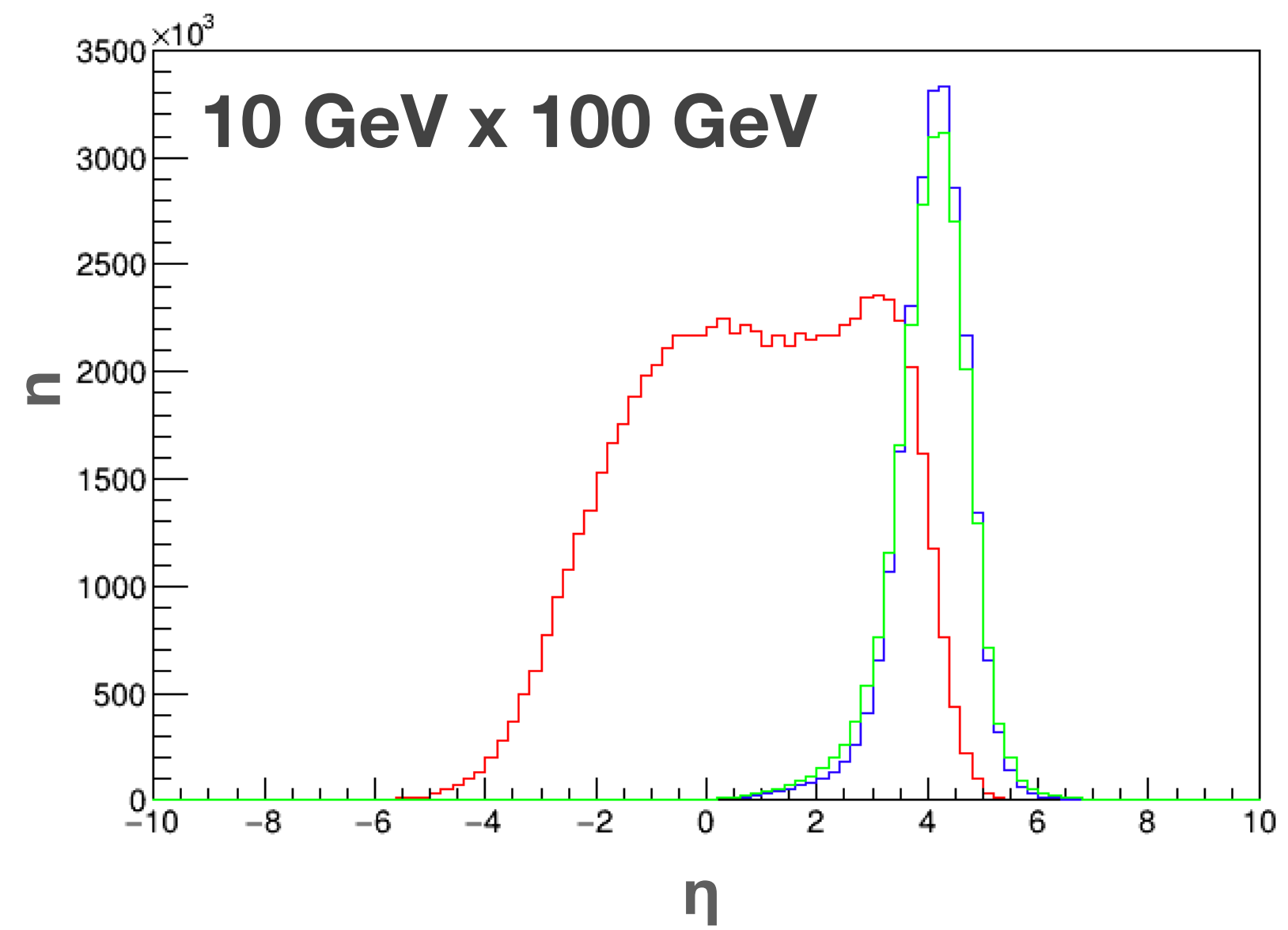
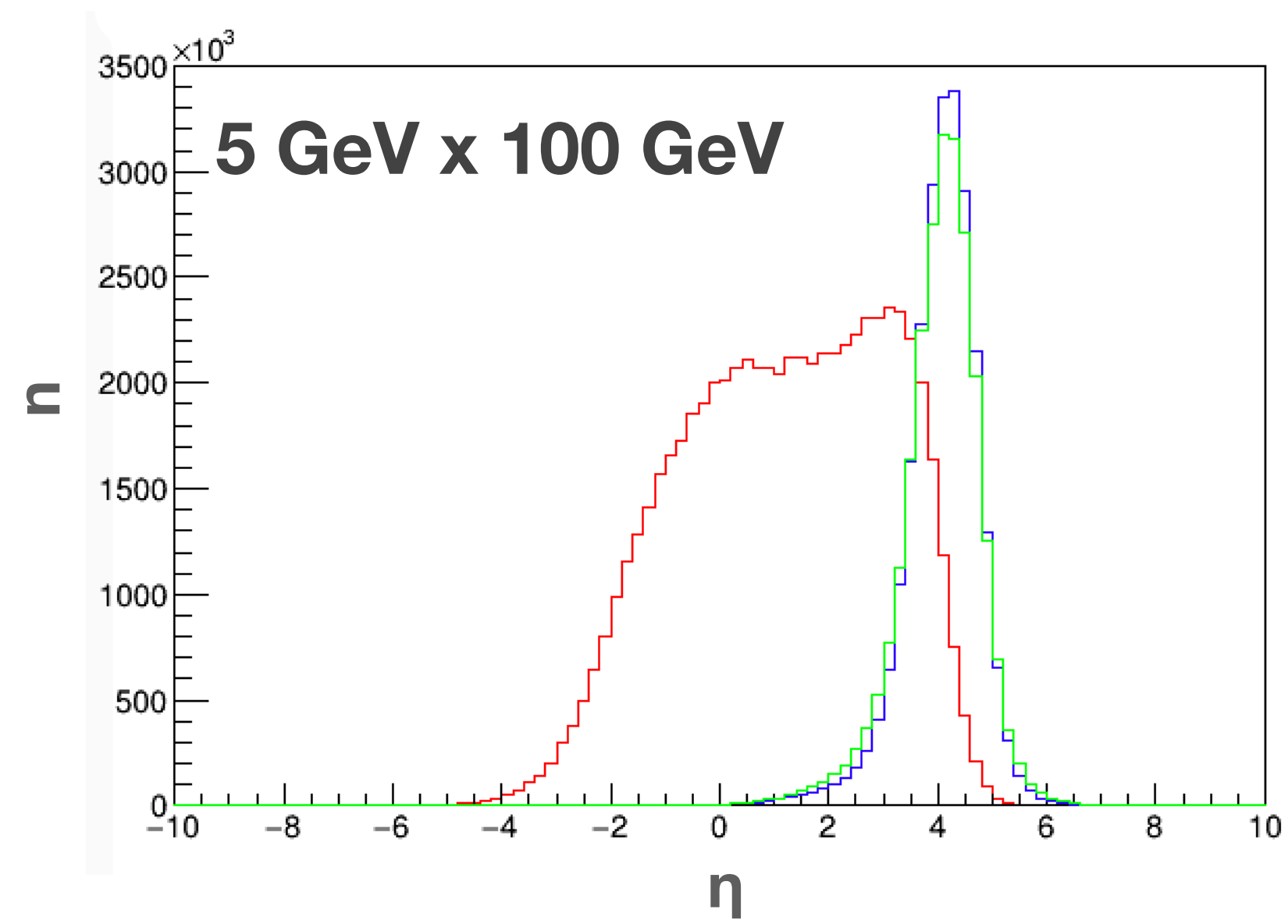
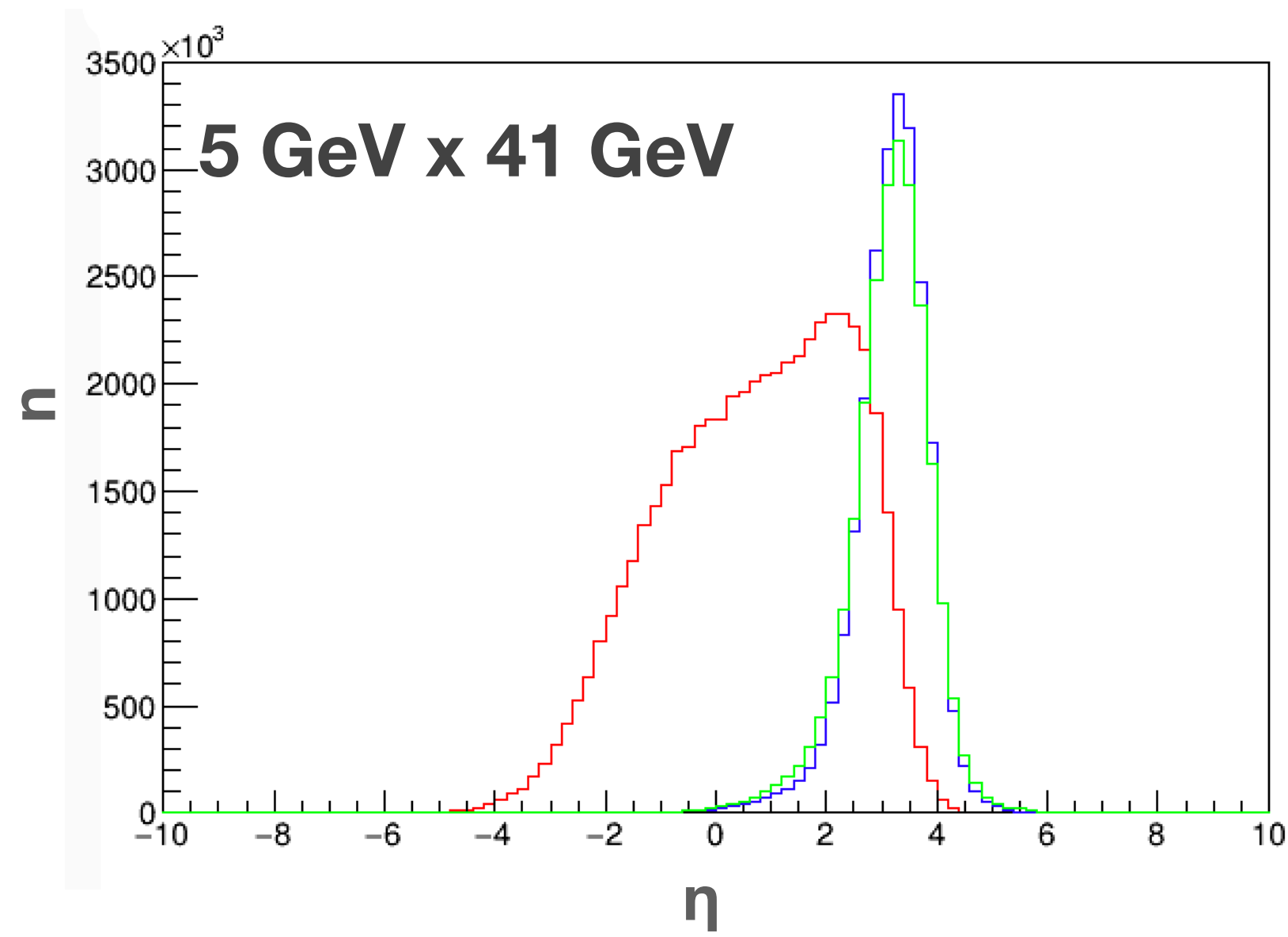


DVCS  $\gamma$  (x10)

DVMP  $\pi^0$

$\gamma$  from  
DVMP  $\pi^0$  decay (x0.5)

# Yields as function of pseudo-rapidity (mind scaling factors)



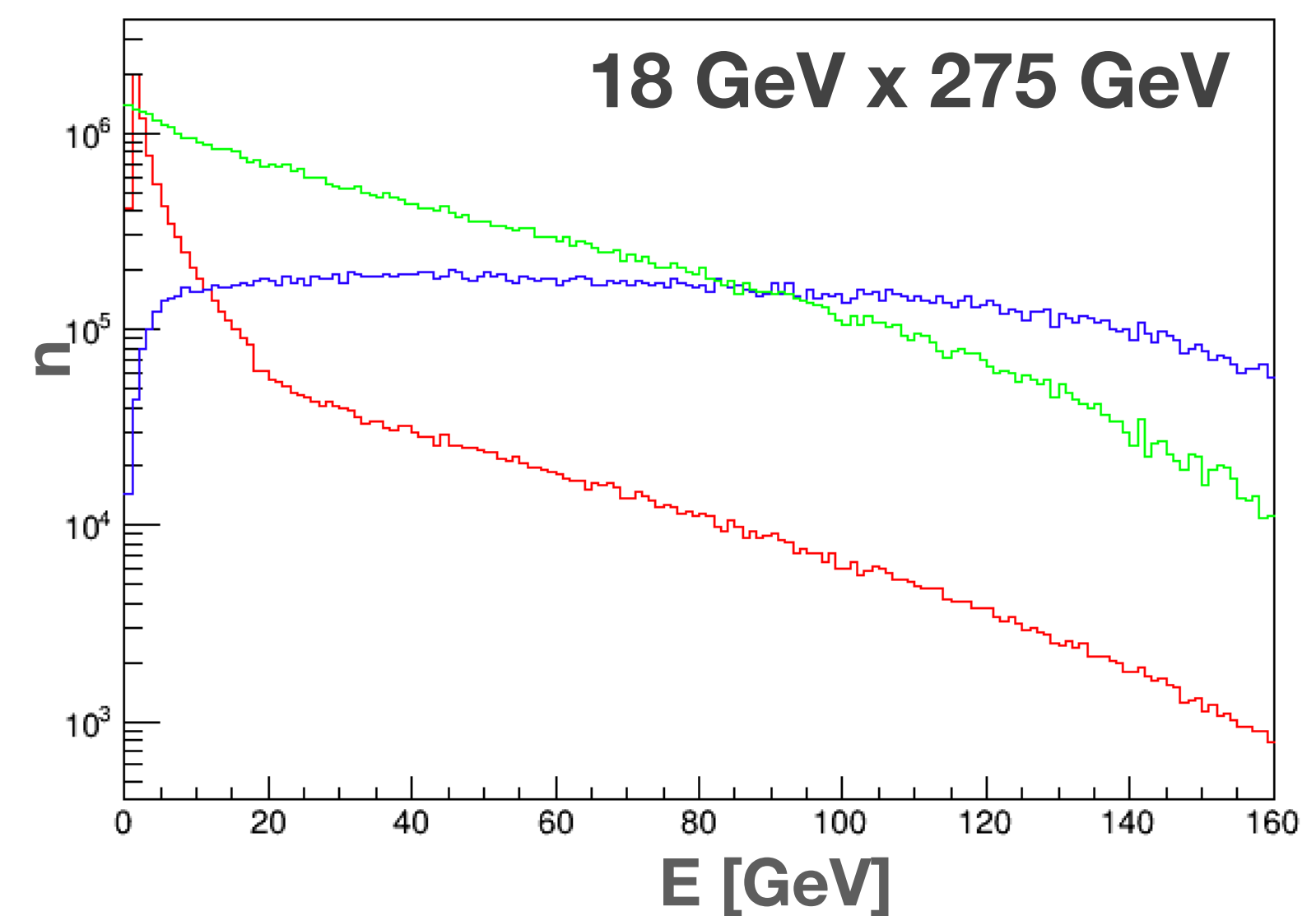
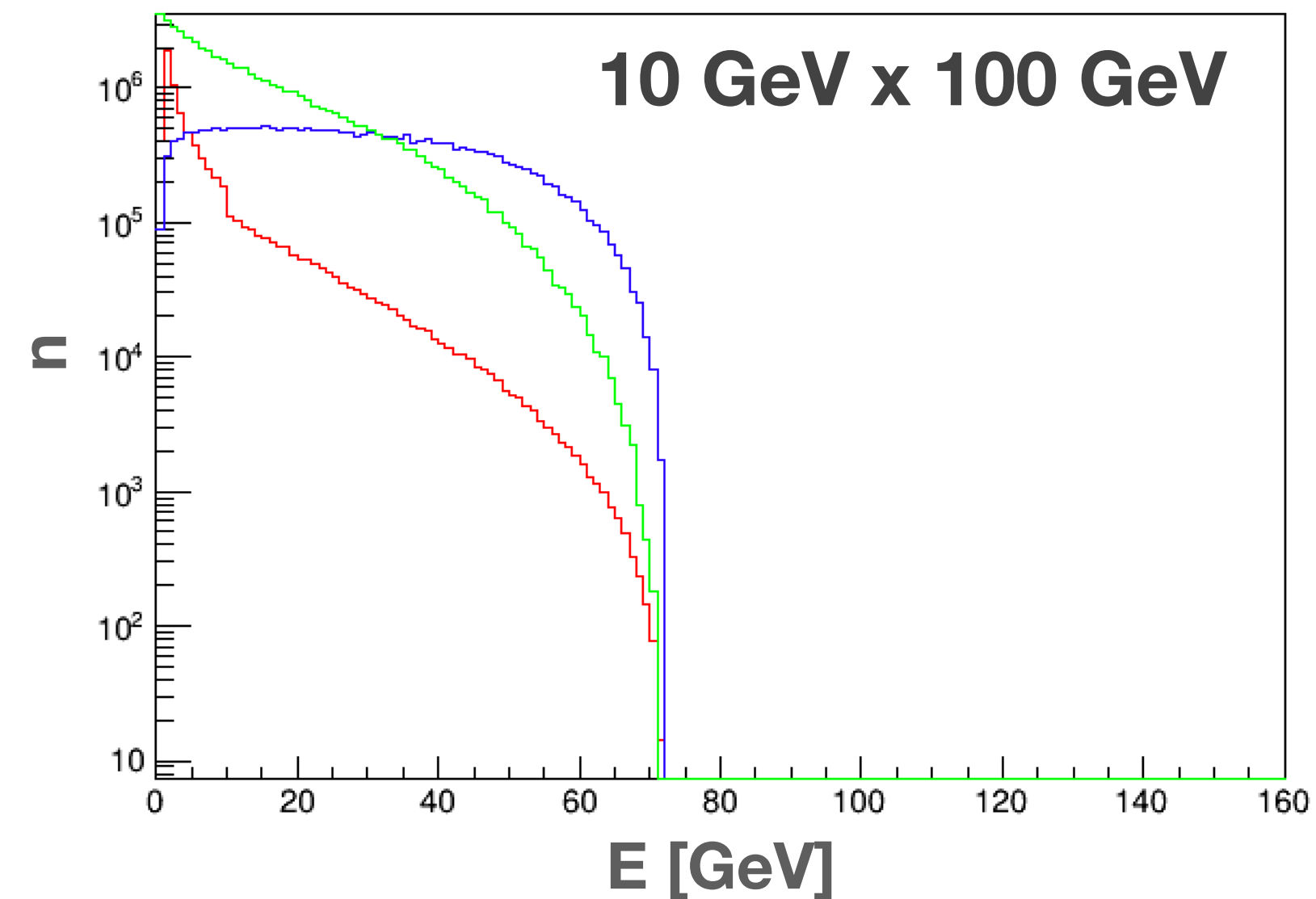
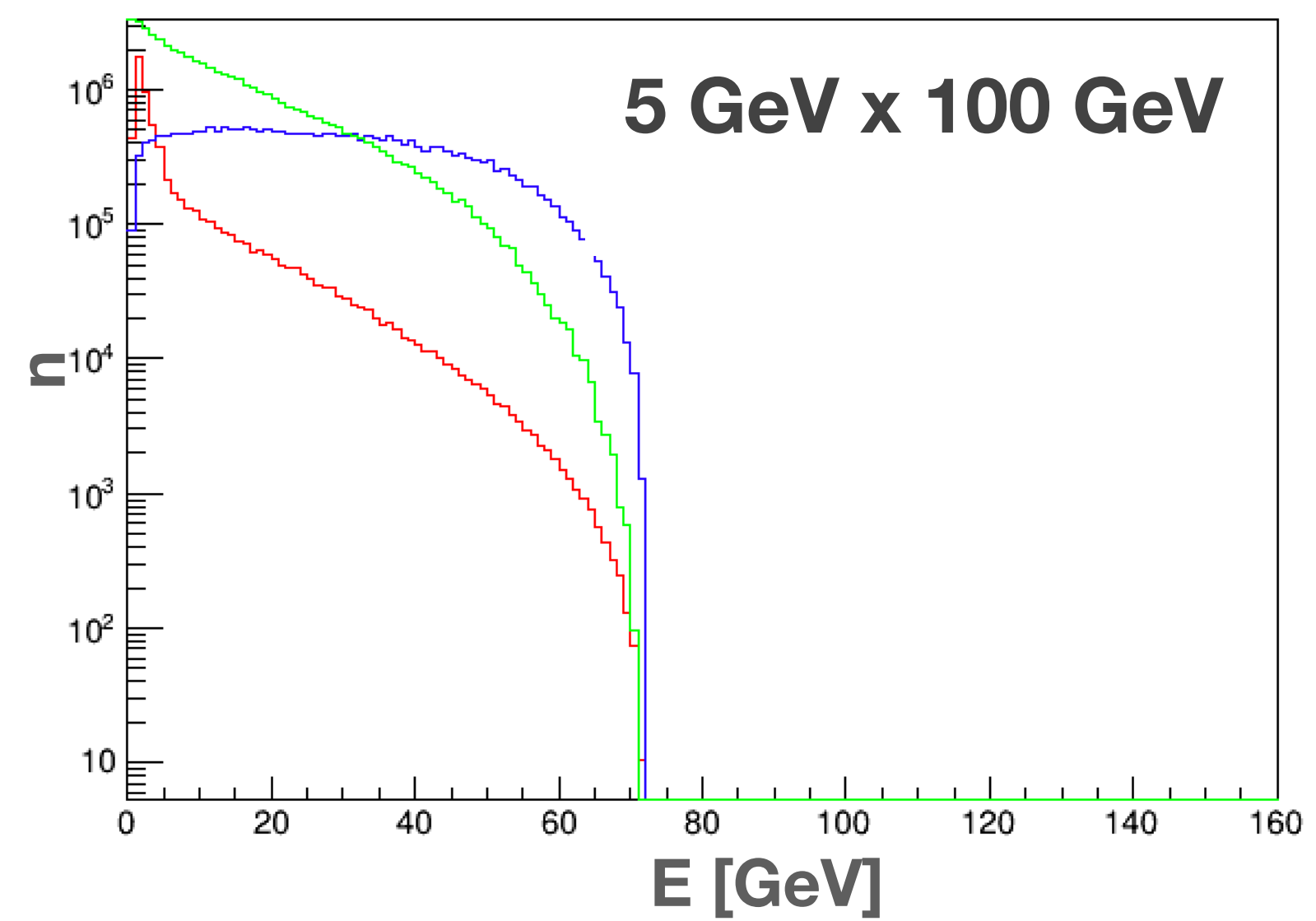
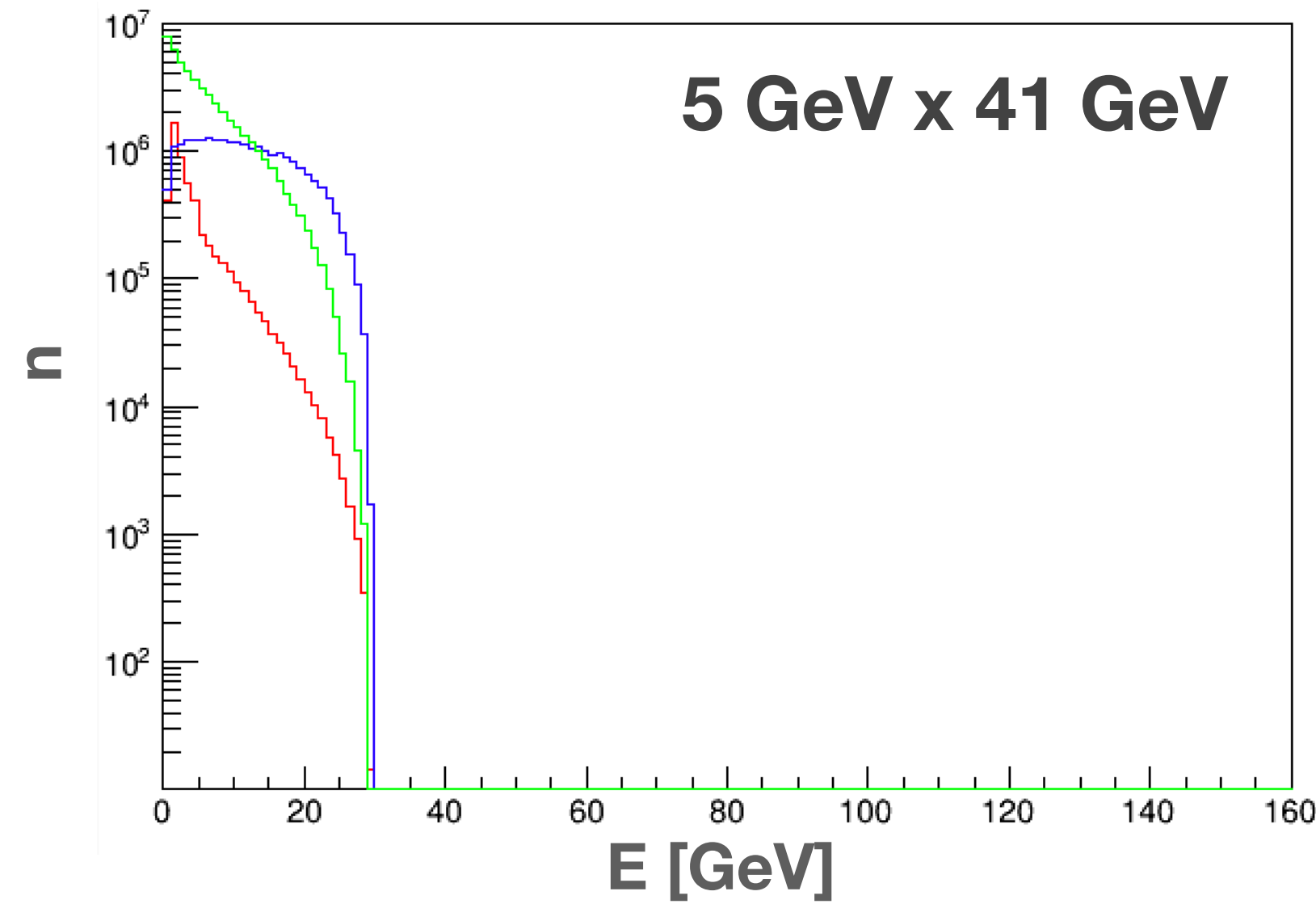
**DVCS  $\gamma$  (x10)**

**DVMP  $\pi^0$**

**$\gamma$  from**

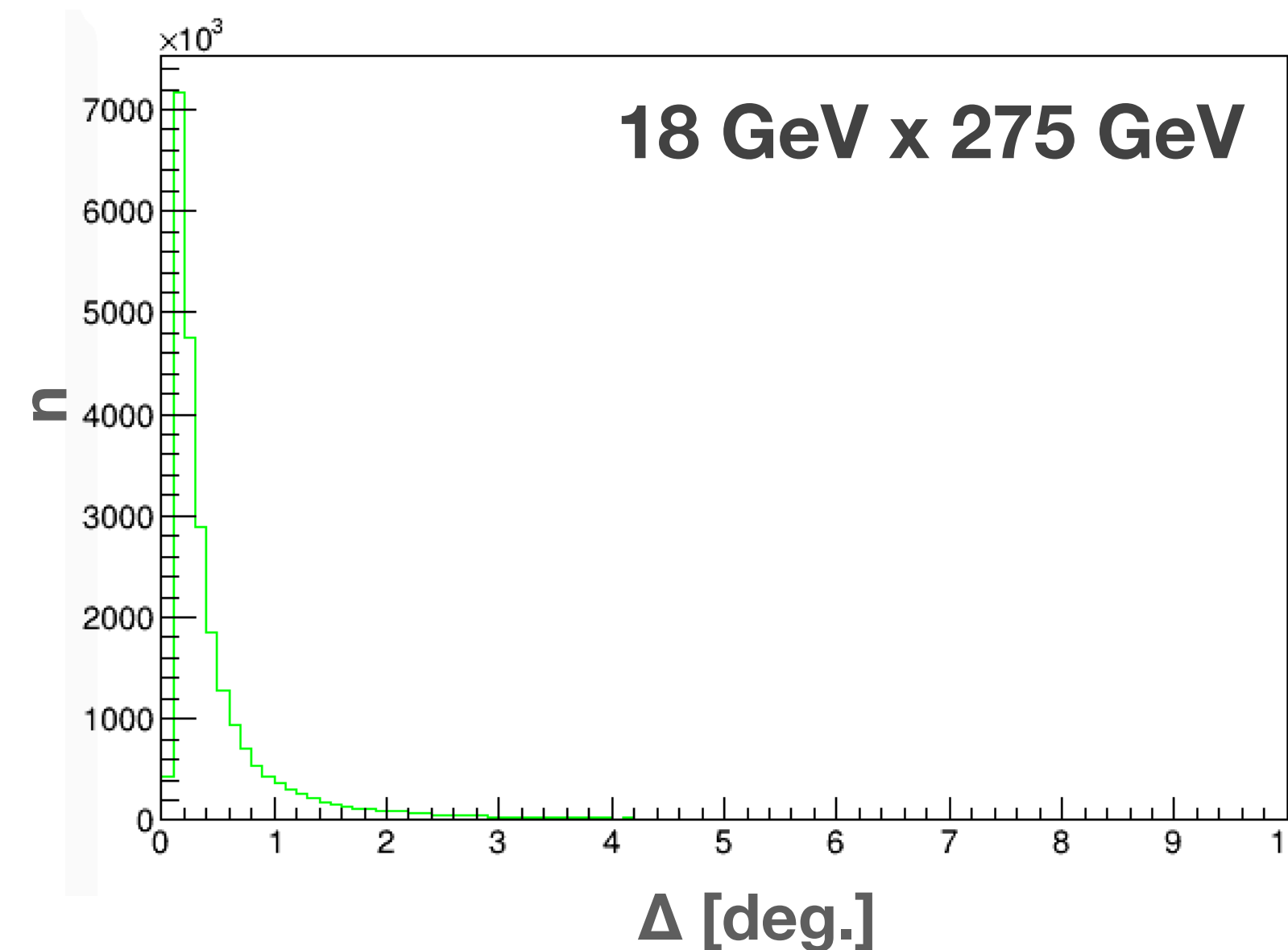
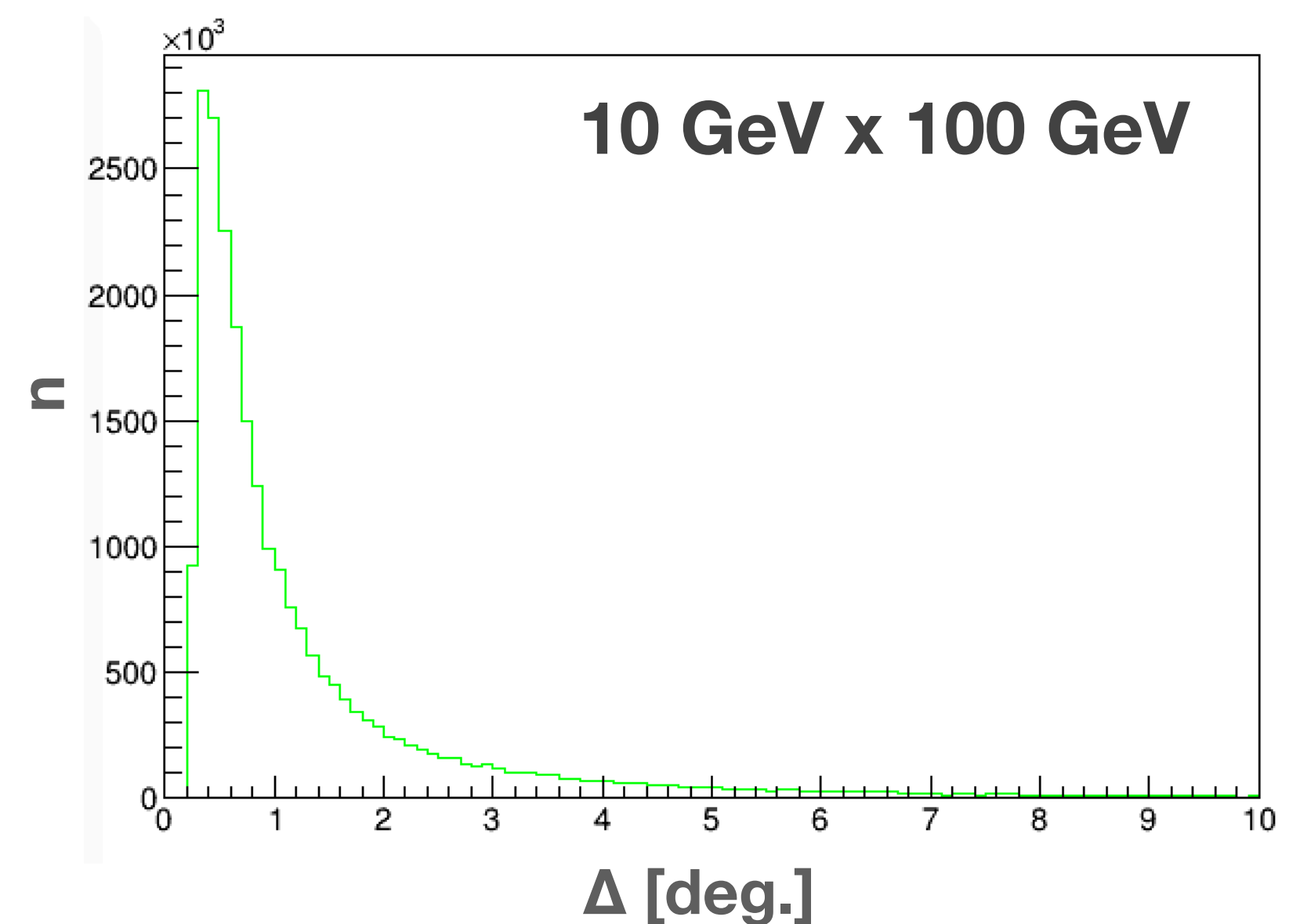
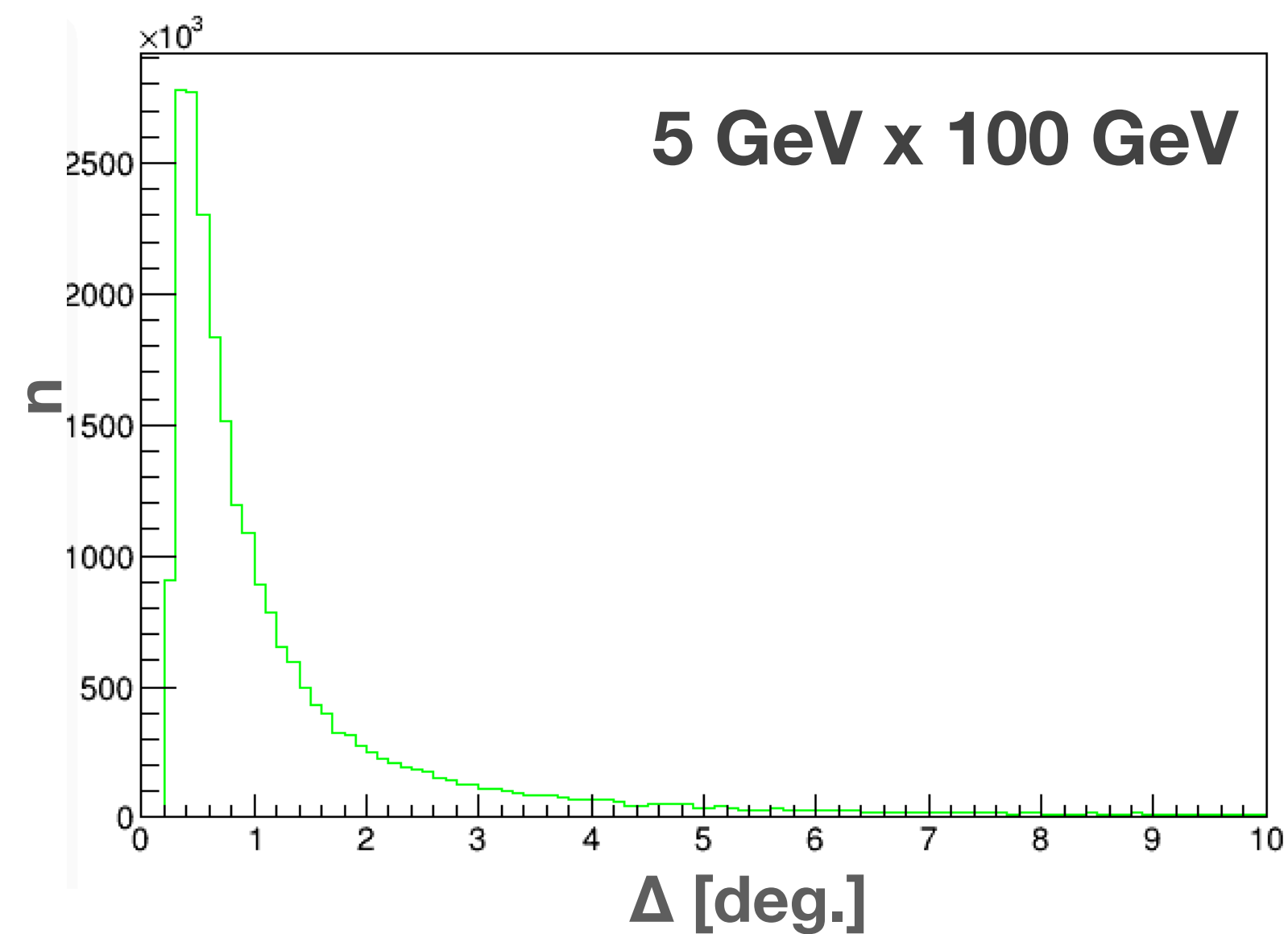
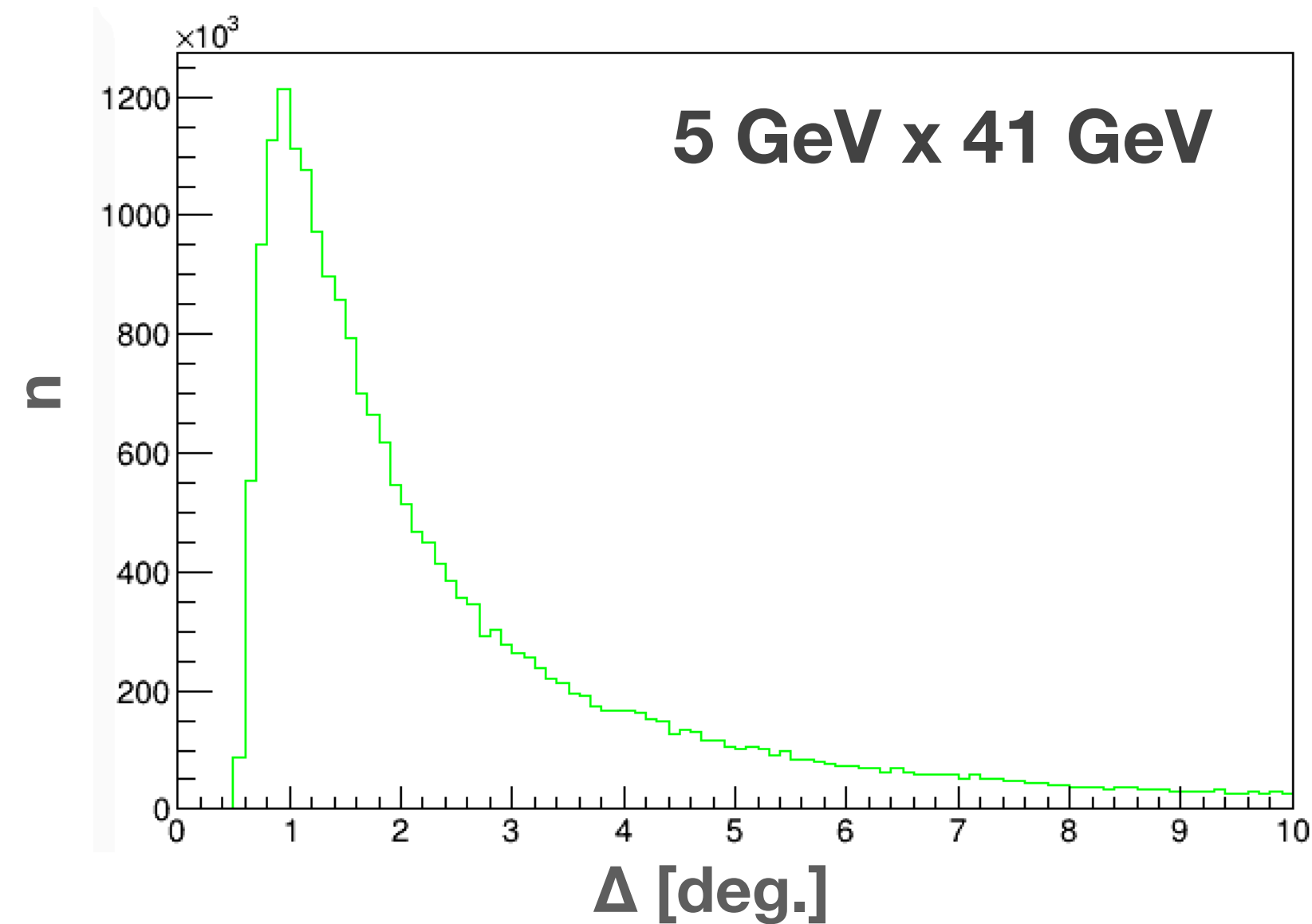
**DVMP  $\pi^0$  decay (x0.5)**

# Yields as function of energy



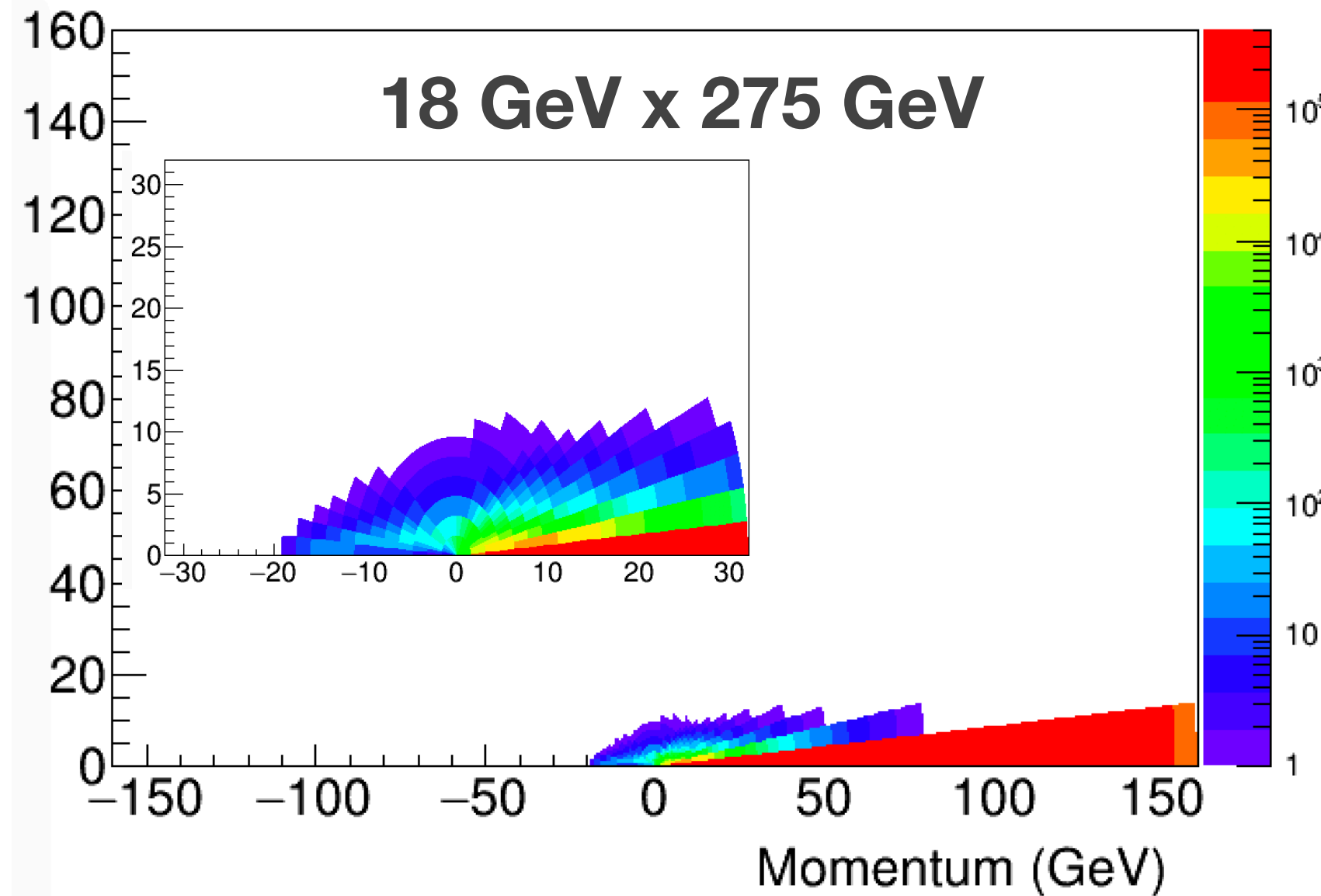
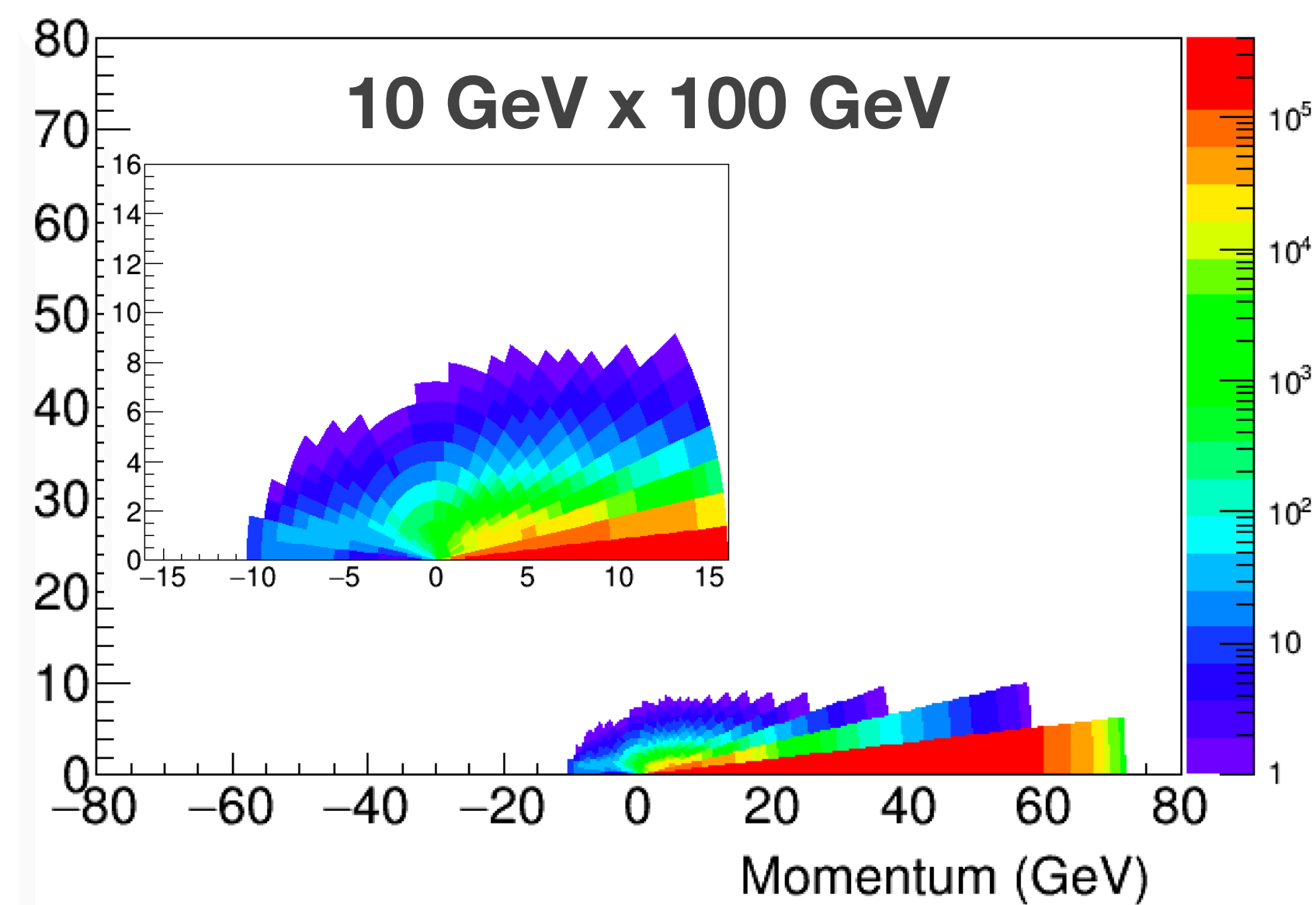
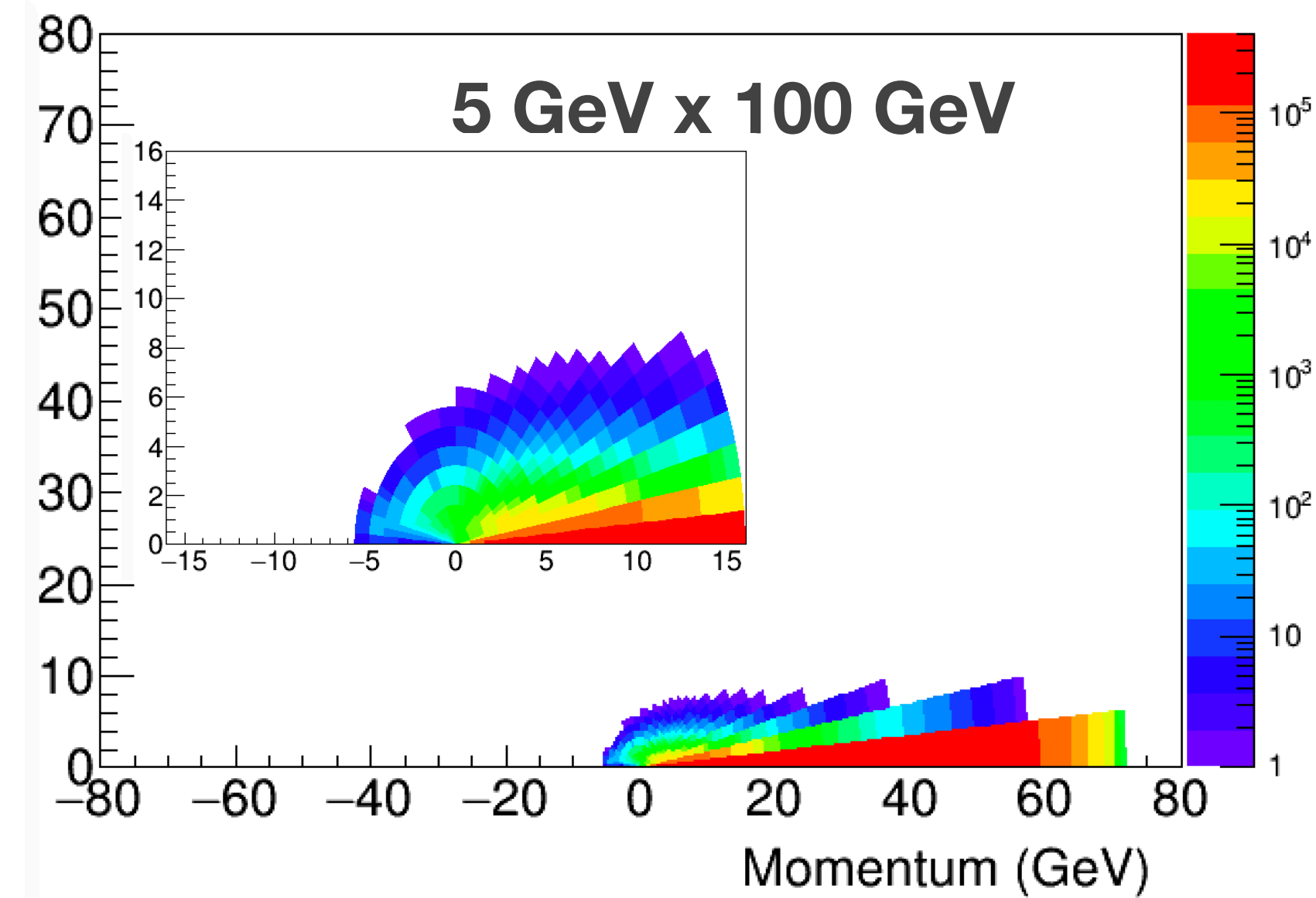
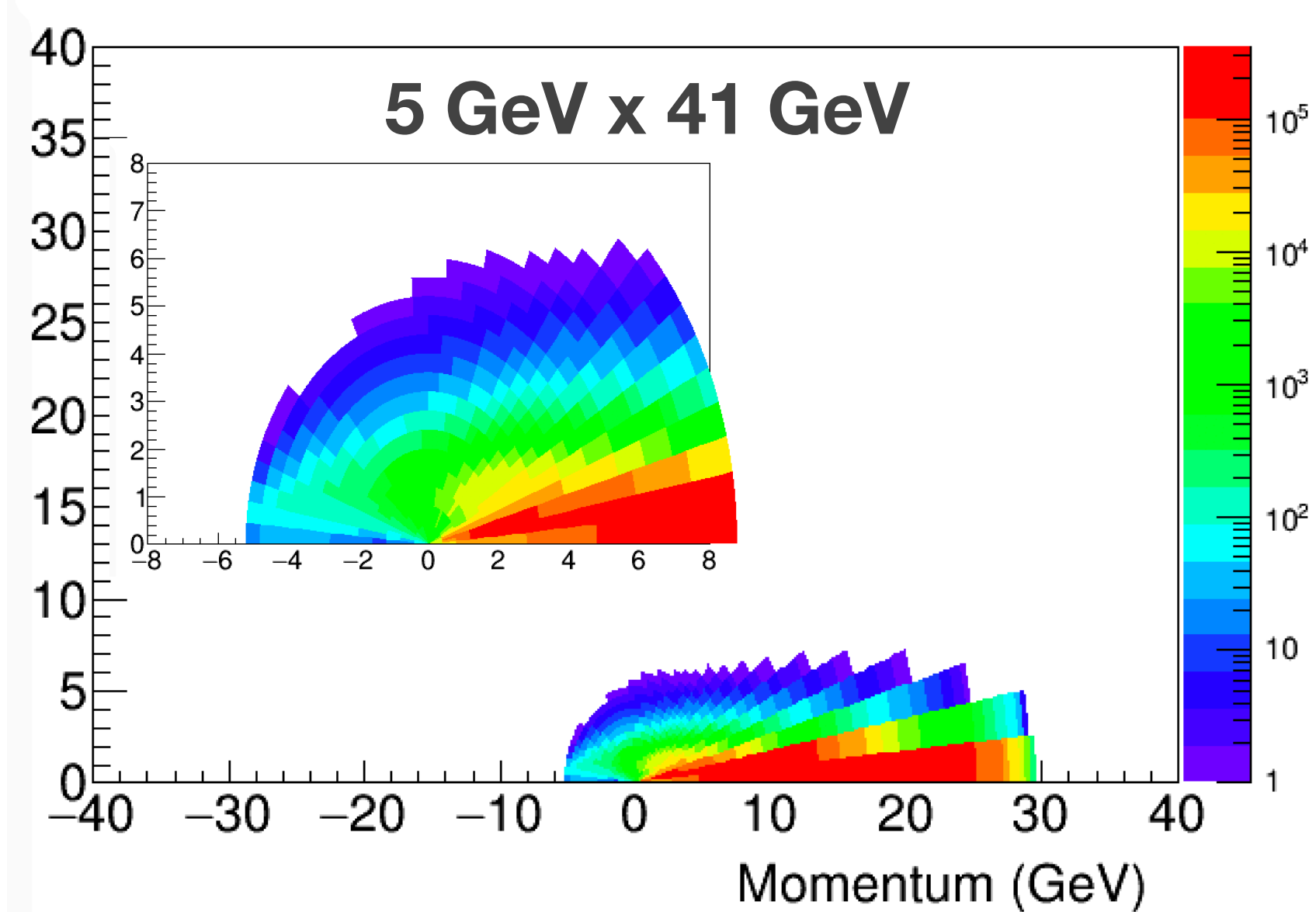
**DVCS  $\gamma$  (x1)**  
**DVMP  $\pi^0$**   
 **$\gamma$  from**  
**DVMP  $\pi^0$  decay (x1)**

# Yields as function of opening angle between $\gamma$ s from DVMP $\pi^0$ decay



$\gamma$  from  
DVMP  $\pi^0$  decay (x1)

# YR plots - DVMP $\pi^0$ (mind various scales)



# YR plots - $\gamma$ from DVMP $\pi^0$ decay (mind various scales)

