$$
\begin{cases}
\sigma_{pp} &= 9B\ln\left(\dfrac{s}{s_0}\right) + 9Y_1^{pp}s^{-\eta_1} - 5Y_2^{\pi p}s^{-\eta_2},\\
\sigma_{\bar{p}p} &= 9B\ln\left(\dfrac{s}{s_0}\right) + 9Y_1^{pp}s^{-\eta_1} + 5Y_2^{\pi p}s^{-\eta_2},\\
\sigma_{\pi^+p} &= 6\lambda_m B\ln\left(\dfrac{s}{s_0}\right) + 6\lambda_{m1}Y_1^{pp}s^{-\eta_1} - Y_2^{\pi p}s^{-\eta_2},\\
\sigma_{\pi^-p} &= 6\lambda_m B\ln\left(\dfrac{s}{s_0}\right) + 6\lambda_{m1}Y_1^{pp}s^{-\eta_1} + Y_2^{\pi p}s^{-\eta_2},\\
\sigma_{K^+p} &= 3\lambda_m(1+\lambda_s)B\ln\left(\dfrac{s}{s_0}\right) + 3\lambda_{m1}(1+\lambda_{s1})Y_1^{pp}s^{-\eta_1} - 2Y_2^{\pi p}s^{-\eta_2},\\
\sigma_{K^-p} &= 3\lambda_m(1+\lambda_s)B\ln\left(\dfrac{s}{s_0}\right) + 3\lambda_{m1}(1+\lambda_{s1})Y_1^{pp}s^{-\eta_1} + 2Y_2^{\pi p}s^{-\eta_2},\\
\sigma_{\gamma p} &= 6\lambda_m\delta B\ln\left(\dfrac{s}{s_0}\right) + 6\lambda_{m1}\delta Y_1^{pp}s^{-\eta_1},\\
\sigma_{\gamma\gamma} &= 4\lambda_m^2\delta^2 B\ln\left(\dfrac{s}{s_0}\right) + 4\lambda_{m1}^2\delta^2 Y_1^{pp1}s^{-\eta_1},\\
\sigma_{\Sigma^-p} &= (6+3\lambda_s)B\ln\left(\dfrac{s}{s_0}\right) + Y_1^{pp}(6+3\lambda_{s1})s^{-\eta_1} - Y_2^{\Sigma p}s^{-\eta_2}.
\end{cases}
$$

$$
\begin{cases}
\rho_{pp}\sigma_{pp} &= \dfrac{9\pi B}{2} - \dfrac{9Y_1^{pp}s^{-\eta_1}}{\tan\left[\dfrac{1-\eta_1}{2}\pi\right]} - \dfrac{5Y_2^{\pi p}s^{-\eta_2}}{\cot\left[\dfrac{1-\eta_2}{2}\pi\right]},\\
\rho_{\bar{p}p}\sigma_{\bar{p}p} &= \dfrac{9\pi B}{2} - \dfrac{9Y_1^{pp}s^{-\eta_1}}{\tan\left[\dfrac{1-\eta_1}{2}\pi\right]} + \dfrac{5Y_2^{\pi p}s^{-\eta_2}}{\cot\left[\dfrac{1-\eta_2}{2}\pi\right]},\\
\rho_{\pi^+p}\sigma_{\pi^+p} &= 3\pi\lambda_m B - \dfrac{6\lambda_{m1}Y_1^{pp}s^{-\eta_1}}{\tan\left[\dfrac{1-\eta_1}{2}\pi\right]} - \dfrac{Y_2^{\pi p}s^{-\eta_2}}{\cot\left[\dfrac{1-\eta_2}{2}\pi\right]},\\
\rho_{\pi^-p}\sigma_{\pi^-p} &= 3\pi\lambda_m B - \dfrac{6\lambda_{m1}Y_1^{pp}s^{-\eta_1}}{\tan\left[\dfrac{1-\eta_1}{2}\pi\right]} + \dfrac{Y_2^{\pi p}s^{-\eta_2}}{\cot\left[\dfrac{1-\eta_2}{2}\pi\right]},\\
\rho_{K^+p}\sigma_{K^+p} &= \dfrac{3\pi\lambda_m(1+\lambda_s)B}{2} - \dfrac{3\lambda_{m1}(1+\lambda_{s1})Y_1^{pp}s^{-\eta_1}}{\tan\left[\dfrac{1-\eta_1}{2}\pi\right]} - \dfrac{2Y_2^{\pi p2}s^{-\eta_2}}{\cot\left[\dfrac{1-\eta_2}{2}\pi\right]},\\
\rho_{K^-p}\sigma_{K^-p} &= \dfrac{3\pi\lambda_m(1+\lambda_s)B}{2} - \dfrac{3\lambda_{m1}(1+\lambda_{s1})Y_1^{pp}s^{-\eta_1}}{\tan\left[\dfrac{1-\eta_1}{2}\pi\right]} + \dfrac{2Y_2^{\pi p2}s^{-\eta_2}}{\cot\left[\dfrac{1-\eta_2}{2}\pi\right]},
\end{cases}
$$

Variable s is in the units $[GeV^2]$. The additional scale $s_1 = 1$ $[GeV^2]$ in terms with $(s/s_1)^{-\eta_{1,2}}$ is omitted for brevity.

Adjustable parameters naming. In total 12 parameters used:

$\eta_1, \eta_2, \delta, \lambda_m, \lambda_s, \lambda_{m1}, \lambda_{s1}$ – dimensionless
s_0 – [GeV^2]
$B, Y_1^{pp}, Y_2^{\pi p}, Y_2^{\Sigma p},$ – [mb]

Scan-fits summary. 2000 database. Without cosmic data points.

E_{cm}^{min} [GeV]	3	4	5	6	7	8	9	10
N_{dof}: ρ excluded	714	569	495	422	357	319	273	218
N_{dof}: ρ included	892	730	636	557	486	441	385	317
χ^2/dof: ρ excluded	2.20	1.22	0.95	0.84	0.86	0.86	0.87	0.85
χ^2/dof: ρ included	2.20	1.30	1.08	1.01	1.02	0.97	0.94	0.94

Details of the fit to the data in the whole domain of applicability

	$\sqrt{s}$ of the starting point in **[GeV]**	Number of data points
Breakdown of the CS data sample		
pp:	8.21361	78
$\bar{p}p$:	8.0405	43
π^+p:	8.15962	28
π^-p:	8.15962	61
K^+p:	8.17372	26
K^-p:	8.17372	37
Σ^-p:	11.922	8
γp:	8.06586	28
$\gamma\gamma$:	8.	22
Breakdown of the ρ data sample		
pp:	8.55262	62
$\bar{p}p$	11.5382	11
π^+p:	8.98072	8
π^-p:	8.36404	28
K^+p:	8.99347	8
K^-p:	11.5102	5

χ^2/dof	=	**0.97**
CL[%]	=	65.79
Name of value	Numerical value	Error value
η_1	0.20200261	0.011790959
η_2	0.55546195	0.0094903965
λ_s	0.87243065	0.014889468
λ_m	1.0340053	0.0092586974
δ	0.0048414731	7.3759186E-06
B	0.75953082	0.035286641
s_0	118.96503	66.907454
Y_{pp1}	11.904844	0.46524013
$Y_{\pi p2}$	7.0913207	0.32958166
$Y_{\Sigma p2}$	42.418519	2.8180956
λ_{s1}	0.63662158	0.026309919
λ_{m1}	0.86860608	0.015496698

Model quality indicators:

	A^M	C_1^M	C_2^M	U^M	R_1^M	R_2^M	S_1^M	S_2^M
R^{qc}R$_c$L ^{qc}(12)	1.733	65.79	78.13	13.03	34.85	0.682	0.440	1.935

Repository:

computer - **NPT1**

directory - `d:\MathemD\Kolja\Evela\Gauron\(RqcRc)Lqc(12)`

Appendix $R^{qc}R_c\ L^{qc}(12)$ (№9) χ^2/NoP by data samples

	CS data								
Reaction	pp	$\bar{p}p$	π^+p	π^-p	K^+p	K^-p	Σ^-p	γp	$\gamma\gamma$
χ^2/NoP	1.09	1.11	0.94	1.04	0.36	0.68	0.45	1.00	0.74

	ρ data					
Reaction	pp	$\bar{p}p$	π^+p	π^-p	K^+p	K^-p
χ^2/NoP	1.21	0.45	1.76	1.31	0.72	1.93

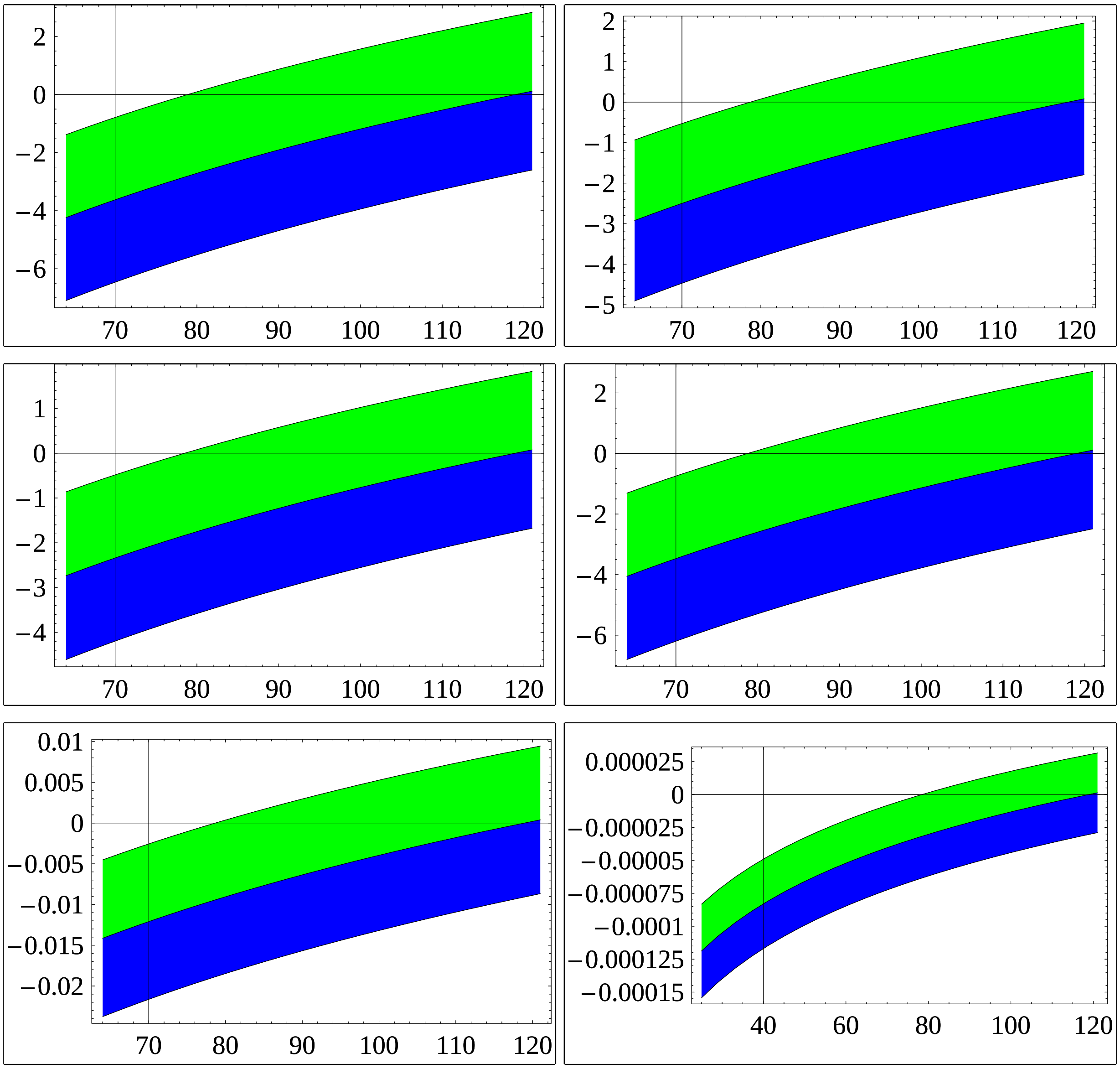


Figure 11: Pomeron contribution for pp, π^+p, K^+p, Σ^-p, γp, $\gamma\gamma$ [mb] (Axis X – s [GeV^2])

	η_1	η_2	λ_s	λ_m	δ	B	s_0	Y_{pp1}	$Y_{\pi p2}$	$Y_{\Sigma p2}$	λ_{s1}	λ_{m1}
η_1	100	16.2	-82.7	-89.4	0.219	**-97.2**	**-99.2**	**-95.4**	15.8	-24.2	**-99.1**	**-99.2**
η_2	16.2	100	-15.8	4.87	2.47	-12	-13.1	-7.86	**98.8**	68.5	-13	-14
λ_s	-82.7	-15.8	100	64.3	0.847	80.6	82.1	79.1	-15.1	20.3	81.4	82.2
λ_m	-89.4	4.87	64.3	100	0.0612	**91.5**	**91.7**	**92.7**	5.47	35.5	**91.7**	**91.1**
δ	0.219	2.47	0.847	0.0612	100	0.577	0.222	0.881	3.12	3.67	0.975	-0.571
B	**-97.2**	-12	80.6	**91.5**	0.577	100	**99.3**	**99.6**	-11.6	26.3	**99.2**	**99.2**
s_0	**-99.2**	-13.1	82.1	**91.7**	0.222	**99.3**	100	**98.4**	-12.6	26.3	**99.9**	**99.9**
Y_{pp1}	**-95.4**	-7.86	79.1	**92.7**	0.881	**99.6**	**98.4**	100	-7.33	28.9	**98.3**	**98.1**
$Y_{\pi p2}$	15.8	**98.8**	-15.1	5.47	3.12	-11.6	-12.6	-7.33	100	68.4	-12.6	-13.7
$Y_{\Sigma p2}$	-24.2	68.5	20.3	35.5	3.67	26.3	26.3	28.9	68.4	100	26.8	25.2
λ_{s1}	**-99.1**	-13	81.4	**91.7**	0.975	**99.2**	**99.9**	**98.3**	-12.6	26.8	100	**99.7**
λ_{m1}	**-99.2**	-14	82.2	**91.1**	-0.571	**99.2**	**99.9**	**98.1**	-13.7	25.2	**99.7**	100

Appendix $R^{qc}R_c$ $L^{qc}(12)$ (№9) Parameters evolution

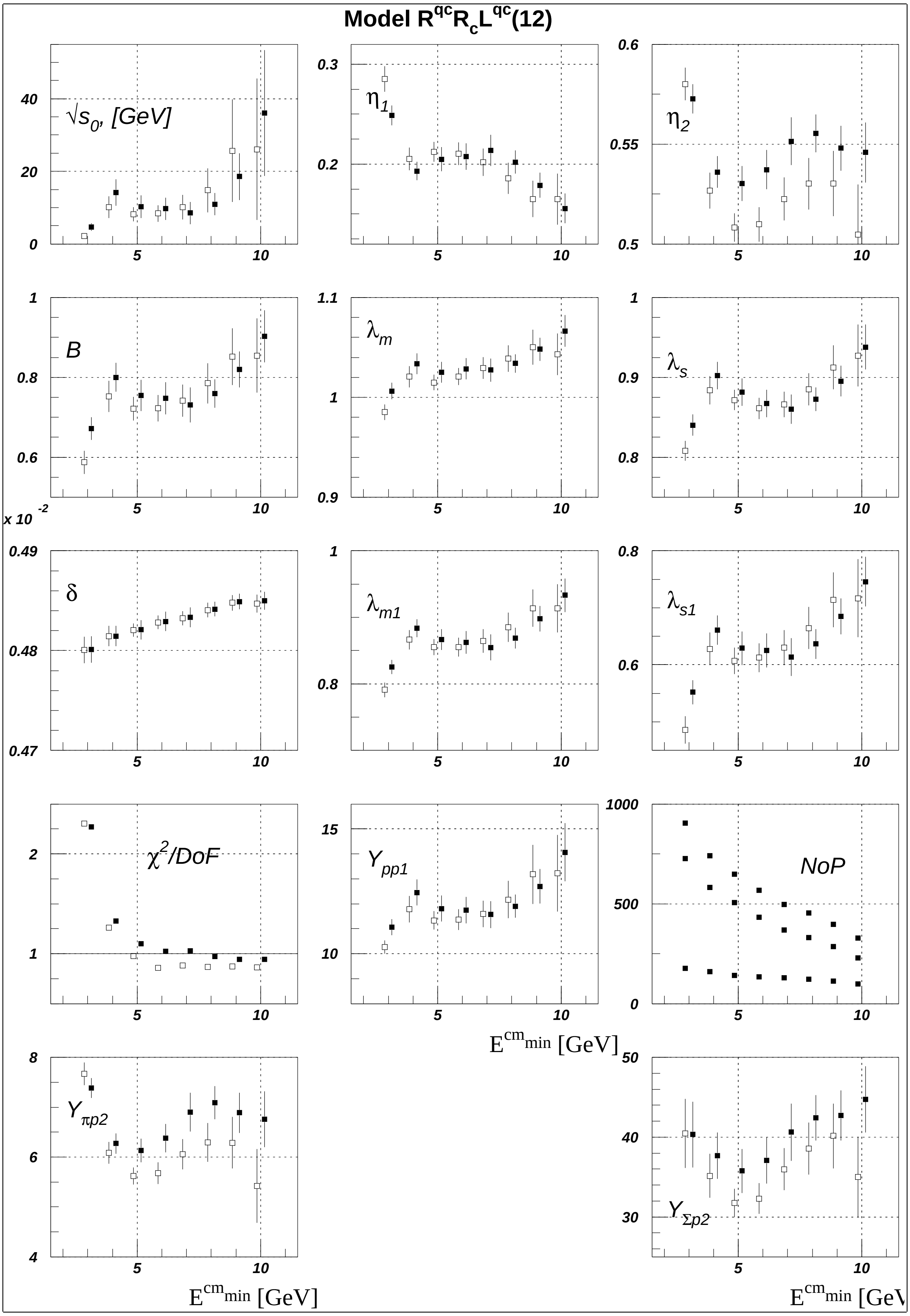
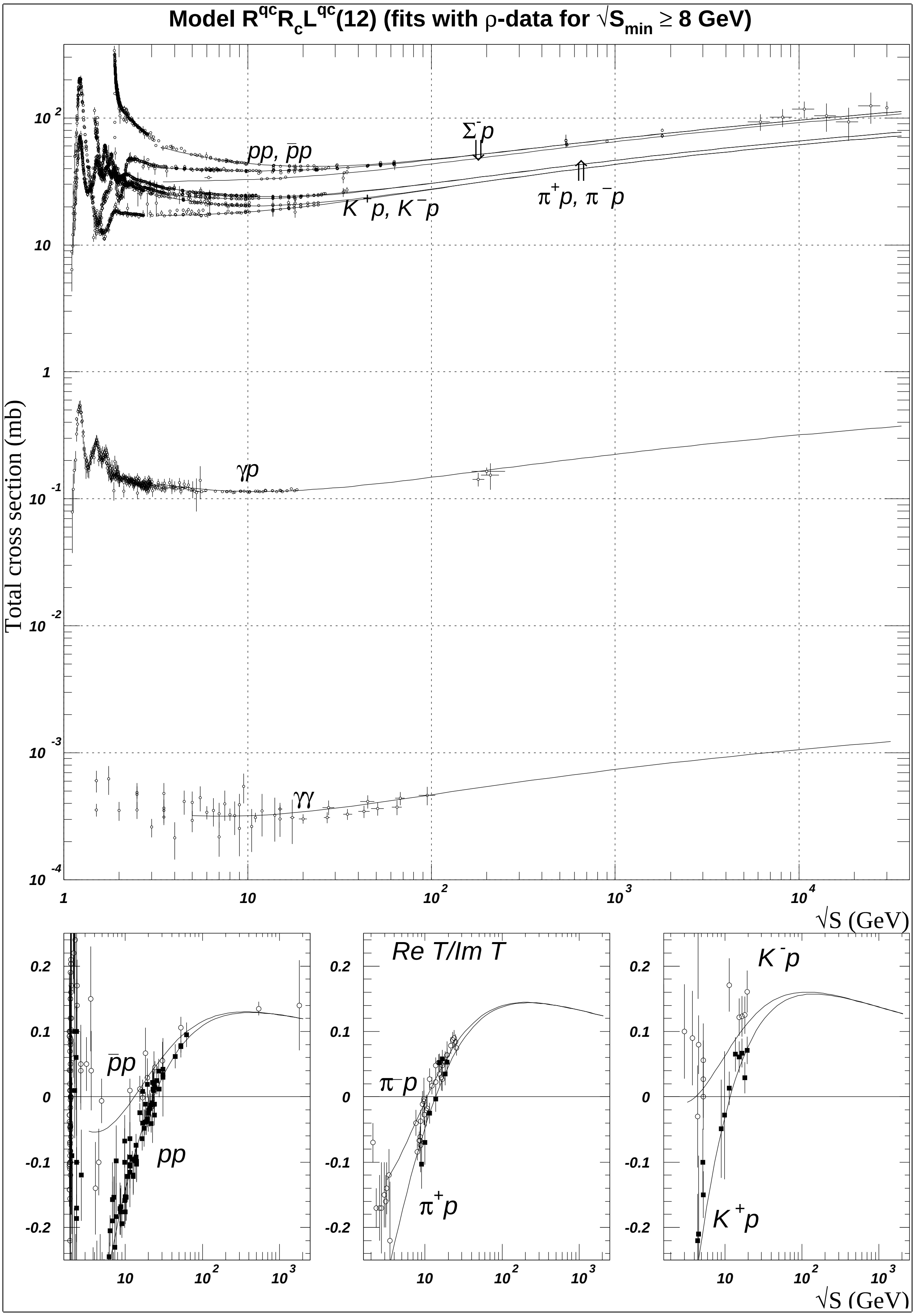


Figure 12: Bold (empty) symbol marks fits with (without) $\boldsymbol{\rho}$ data and are shifted to the right (left) in energy slightly for the clereness


Model R^qc R_c L^qc(12) (fits with ρ-data for √S_min ≥ 8 GeV)
Total cross section (mb)
pp, p̄p
Σ⁻p
π⁺p, π⁻p
K⁺p, K⁻p
γp
γγ
√S (GeV)
Re T/Im T
p̄p
pp
π⁻p
π⁺p
K⁻p
K⁺p
√S (GeV)