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

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

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 14 parameters used:

$\eta_1, \eta_2, \lambda_m, \lambda_s, \lambda_{m1}, \lambda_{s1}, \delta$ – dimensionless
s_0 – $[\mathbf{GeV^2}]$
$B, Y_{1,2}^{pp}, Y_2^{\pi p}, Y_2^{Kp}, Y_2^{\Sigma p}$ – [mb]

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

$E_{\rm cm}^{\rm min}$ [GeV]	3	4	5	6	7	8	9	10
N_{dof}: ρ excluded	712	567	493	420	355	317	271	216
N_{dof}: ρ included	890	728	634	555	484	439	383	315
χ^2/dof: ρ excluded	1.44	1.03	0.88	0.85	0.89	0.87	0.88	0.86
χ^2/dof: ρ included	1.70	1.16	1.02	1.01	1.03	0.98	0.95	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
$\gamma\gamma$:	8.0	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	=	**0.976**
CL[%]	=	63.29
Name of value	Numerical value	Error value
η_1	0.20193472	0.011847792
η_2	0.55543486	0.0095560182
λ_s	0.8725757	0.015054516
λ_m	1.0340245	0.0092894337
δ	0.0048414074	7.4426937E-06
B	0.75972486	0.03548421
s_0	119.34367	67.486864
$\sqrt{s_0}$	10.9245	3.0888
Y_{pp1}	11.907349	0.46833634
Y_{pp2}	35.454203	1.6900961
$Y_{\pi p2}$	7.0801919	0.36793712
Y_{Kp2}	14.185541	0.66444404
$Y_{\Sigma p2}$	42.413774	2.8458608
λ_{s1}	0.63673846	0.026435165
λ_{m1}	0.86870522	0.015587288

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
$\mathbf{R^{qc}RL^{qc}(14)}$	1.734	63.29	76.41	13.09	30.2	0.747	0.533	1.082

Repository:

computer - **NPT1**

`directory - d:\MathemD\Kolja\Evela\Gauron\(RqcR)Lqc(14)`

Appendix $R^{qc}RL^{qc}(14)$ (№8) 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	0.35	0.35	0.36	0.68	0.45	1.0	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

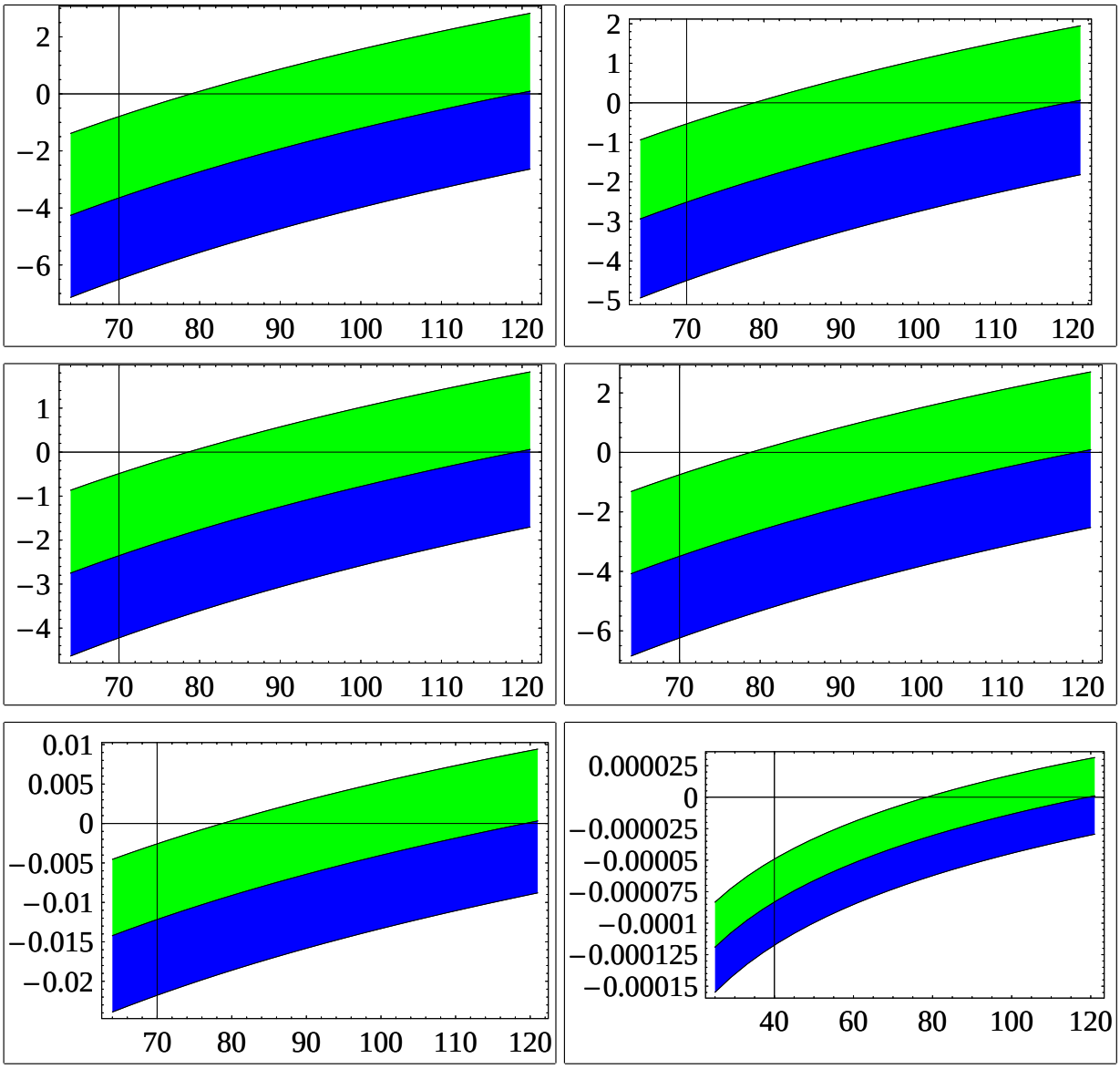


Figure 30: Pomeron contribution for pp, π^+p, K^+p, Σ^-p, γp and $\gamma\gamma$ [mb] (Axis X – s [GeV^2])

	η_1	η_2	λ_s	λ_m	δ	B	s_0	Y_{pp1}	Y_{pp2}	$Y_{\pi p2}$	Y_{Kp2}	$Y_{\Sigma p2}$	λ_{s1}	λ_{m1}
η_1	100	15.9	-82.7	-89.3	1.47	**-97.2**	**-99.2**	**-95.4**	14.4	17.9	15.6	-24.4	**-99.1**	**-99.2**
η_2	15.9	100	-16.2	5.46	2.65	-11.6	-12.6	-7.33	**98.2**	89.6	**96**	69	-12.5	-13.6
λ_s	-82.7	-16.2	100	63.9	-1.02	80.5	82.1	78.9	-14.9	-19.7	-13.9	19.5	81.2	82.3
λ_m	-89.3	5.46	63.9	100	-0.55	**91.5**	**91.6**	**92.6**	6.82	3.43	4.84	35.9	**91.7**	**91**
δ	1.47	2.65	-1.02	-0.549	100	-0.66	-1.04	-0.37	2.63	8.63	2.54	3.51	-0.0764	-1.94
B	**-97.2**	-11.6	80.5	**91.5**	-0.66	100	**99.3**	**99.6**	-10.1	-14	-11.6	26.6	**99.2**	**99.2**
s_0	**-99.2**	-12.6	82.1	**91.6**	-1.04	**99.3**	100	**98.4**	-11.1	-15	-12.5	26.6	**99.9**	**99.9**
Y_{pp1}	**-95.4**	-7.33	78.9	**92.6**	-0.37	**99.6**	**98.4**	100	-5.72	-10.1	-7.48	29.3	**98.3**	**98.1**
Y_{pp2}	14.4	**98.2**	-14.9	6.82	2.63	-10.1	-11.1	-5.72	100	87.9	**94.3**	69.2	-11	-12.4
$Y_{\pi p2}$	17.9	89.6	-19.7	3.43	8.63	-14	-15	-10.1	87.9	100	86	61.6	-14.2	-16.5
Y_{Kp2}	15.6	**96**	-13.9	4.84	2.54	-11.6	-12.5	-7.48	**94.3**	86	100	65.6	-12.7	-13.5
$Y_{\Sigma p2}$	-24.4	69	19.5	35.9	3.51	26.6	26.6	29.3	69.2	61.6	65.6	100	27.1	25.3
λ_{s1}	**-99.1**	-12.5	81.2	91.7	-0.076	**99.2**	**99.9**	**98.3**	-11	-14.2	-12.7	27.1	100	**99.7**
λ_{s1}	**-99.2**	-13.6	82.3	**91**	-1.94	**99.2**	**99.9**	**98.1**	-12.4	-16.5	-13.5	25.3	**99.7**	100

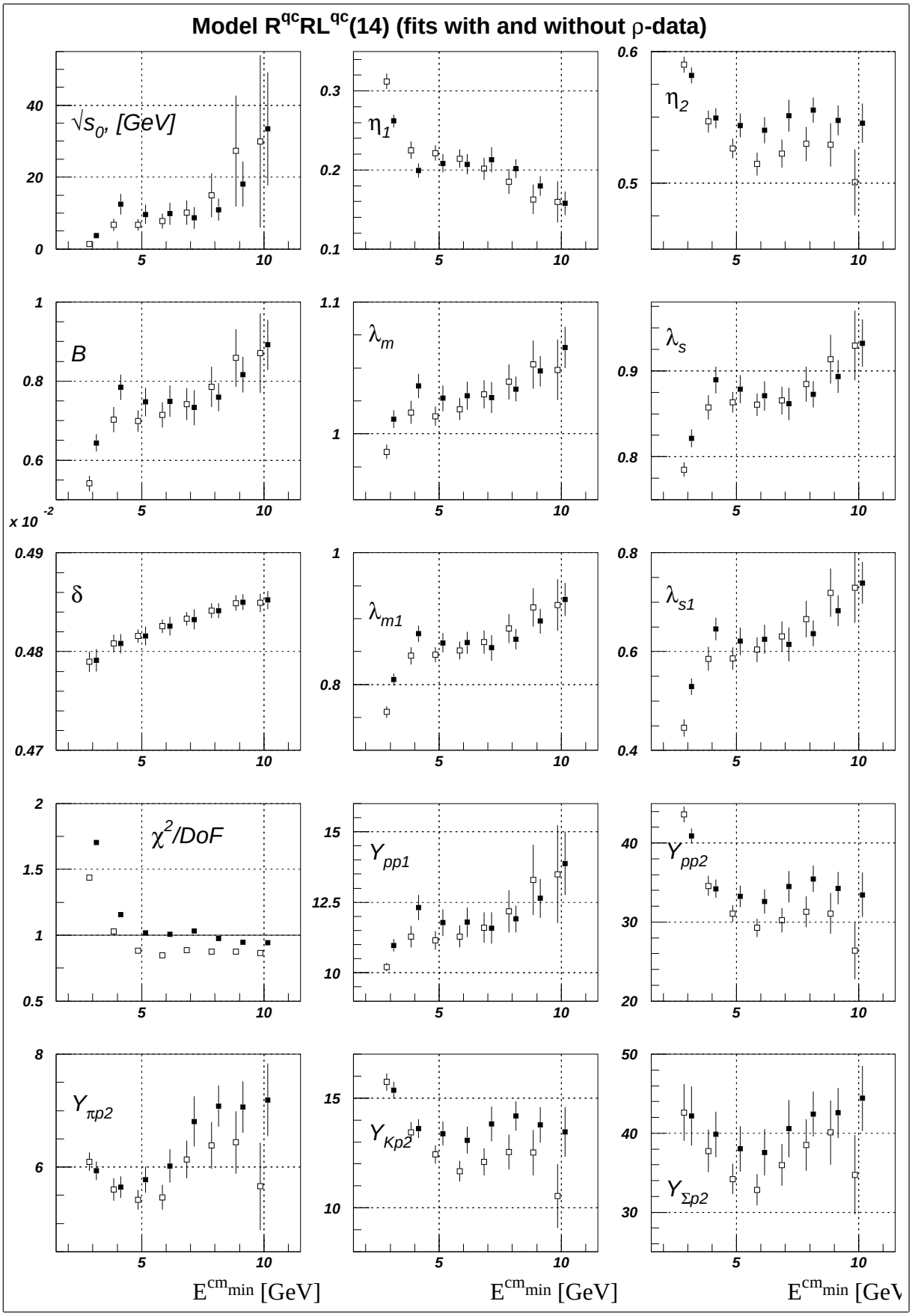
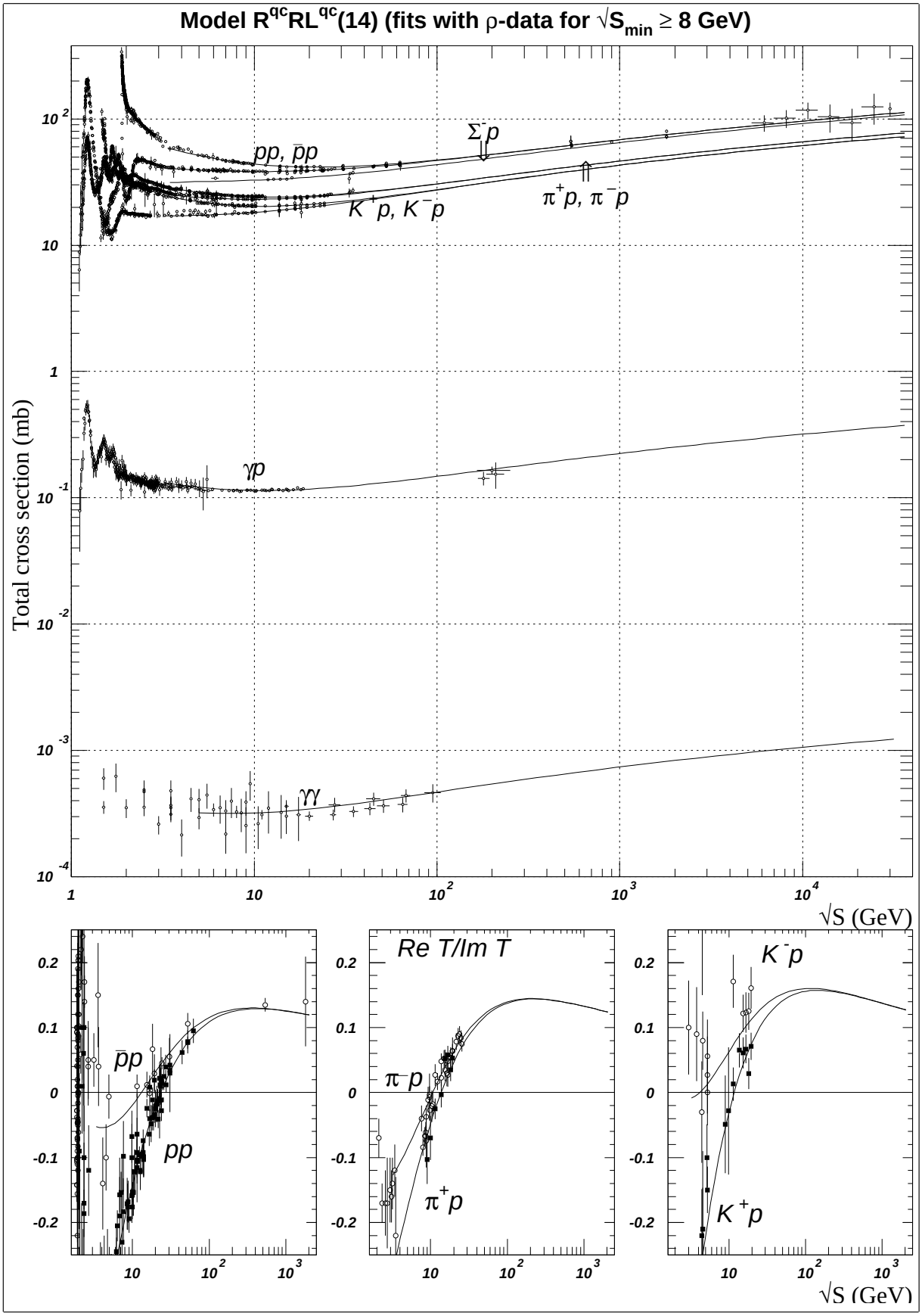


Figure 31: Bold (empty) symbol marks fits with (without) $\boldsymbol{\rho}$ data and are shifted to the right (left) in energy slightly for the cleareness


Model $R^{qc}RL^{qc}(14)$ (fits with ρ-data for $\sqrt{S_{min}} \geq 8$ GeV)
Total cross section (mb)
√S (GeV)
pp, p̄p
Σ⁻p
K⁺p, K⁻p
π⁺p, π⁻p
γp
γγ
Re T/Im T
p̄p
pp
π⁻p
π⁺p
K⁻p
K⁺p