$$
\begin{cases}
\sigma_{pp} &= B_{pp}\ln\left(\dfrac{s}{s_0}\right) + Y_1^{pp}s^{-\eta_1} - Y_2^{pp}s^{-\eta_2},\\
\sigma_{\bar{p}p} &= B_{pp}\ln\left(\dfrac{s}{s_0}\right) + Y_1^{pp}s^{-\eta_1} + Y_2^{pp}s^{-\eta_2},\\
\sigma_{\pi^+p} &= B_{\pi p}\ln\left(\dfrac{s}{s_0}\right) + Y_1^{\pi p}s^{-\eta_1} - Y_2^{\pi p}s^{-\eta_2},\\
\sigma_{\pi^-p} &= B_{\pi p}\ln\left(\dfrac{s}{s_0}\right) + Y_1^{\pi p}s^{-\eta_1} + Y_2^{\pi p}s^{-\eta_2},\\
\sigma_{K^+p} &= B_{Kp}\ln\left(\dfrac{s}{s_0}\right) + Y_1^{Kp}s^{-\eta_1} - Y_2^{Kp}s^{-\eta_2},\\
\sigma_{K^-p} &= B_{Kp}\ln\left(\dfrac{s}{s_0}\right) + Y_1^{Kp}s^{-\eta_1} + Y_2^{Kp}s^{-\eta_2},\\
\sigma_{\gamma p} &= \delta B_{pp}\ln\left(\dfrac{s}{s_0}\right) + Y_1^{\gamma p}s^{-\eta_1},\\
\sigma_{\gamma\gamma} &= \delta^2 B_{pp}\ln\left(\dfrac{s}{s_0}\right) + Y_1^{\gamma\gamma}s^{-\eta_1},\\
\sigma_{\Sigma^-p} &= B_{\Sigma p}\ln\left(\dfrac{s}{s_0}\right) + Y_1^{\Sigma p}s^{-\eta_1} - Y_2^{\Sigma p}s^{-\eta_2}. \quad \blacksquare
\end{cases}
$$

$$
\begin{cases}
\rho_{pp}\sigma_{pp} &= \dfrac{\pi B_{pp}}{2} - \dfrac{Y_1^{pp}s^{-\eta_1}}{\tan\left[\dfrac{1-\eta_1}{2}\pi\right]} - \dfrac{Y_2^{pp}s^{-\eta_2}}{\cot\left[\dfrac{1-\eta_2}{2}\pi\right]},\\
\rho_{\bar{p}p}\sigma_{\bar{p}p} &= \dfrac{\pi B_{pp}}{2} - \dfrac{Y_1^{pp}s^{-\eta_1}}{\tan\left[\dfrac{1-\eta_1}{2}\pi\right]} + \dfrac{Y_2^{pp}s^{-\eta_2}}{\cot\left[\dfrac{1-\eta_2}{2}\pi\right]},\\
\rho_{\pi^+p}\sigma_{\pi^+p} &= \dfrac{\pi B_{\pi p}}{2} - \dfrac{Y_1^{\pi p}s^{-\eta_1}}{\tan\left[\dfrac{1-\eta_1}{2}\pi\right]} - \dfrac{Y_2^{\pi p}s^{-\eta_2}}{\cot\left[\dfrac{1-\eta_2}{2}\pi\right]},\\
\rho_{\pi^-p}\sigma_{\pi^-p} &= \dfrac{\pi B_{\pi p}}{2} - \dfrac{Y_1^{\pi p}s^{-\eta_1}}{\tan\left[\dfrac{1-\eta_1}{2}\pi\right]} + \dfrac{Y_2^{\pi p}s^{-\eta_2}}{\cot\left[\dfrac{1-\eta_2}{2}\pi\right]},\\
\rho_{K^+p}\sigma_{K^+p} &= \dfrac{\pi B_{Kp}}{2} - \dfrac{Y_1^{Kp}s^{-\eta_1}}{\tan\left[\dfrac{1-\eta_1}{2}\pi\right]} - \dfrac{Y_2^{Kp}s^{-\eta_2}}{\cot\left[\dfrac{1-\eta_2}{2}\pi\right]},\\
\rho_{K^-p}\sigma_{K^-p} &= \dfrac{\pi B_{Kp}}{2} - \dfrac{Y_1^{Kp}s^{-\eta_1}}{\tan\left[\dfrac{1-\eta_1}{2}\pi\right]} + \dfrac{Y_2^{Kp}s^{-\eta_2}}{\cot\left[\dfrac{1-\eta_2}{2}\pi\right]},
\end{cases}
$$

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 18 parameters used:

η_1, η_2, δ – dimensionless
s_0 – [GeV^2]
$B_{pp}, B_{\pi p}, B_{Kp}, B_{\Sigma p}, Y^{pp}_{1,2}, Y^{\pi p}_{1,2}, Y^{Kp}_{1,2}, Y^{\Sigma p}_{1,2}, Y^{\gamma p}_1, Y^{\gamma\gamma}_1$ – [mb]

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

$E^{\min}_{\rm cm}$ [GeV]	3	4	5	6	7	8	9	10
N_{dof}: ρ excluded	708	563	489	416	351	313	267	212
N_{dof}: ρ included	886	724	630	551	480	435	379	311
χ^2/dof: ρ excluded	1.33	0.98	0.85	0.83	0.87	0.87	0.87	0.86
χ^2/dof: ρ included	1.63	1.13	0.99	0.99	1.02	0.97	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:	5.00963	112
$\bar{p}p$:	5.1569	59
π^+p:	5.21275	50
π^-p:	5.02954	106
K^+p:	5.12707	40
K^-p:	5.10875	63
Σ^-p:	6.12189	9
γp:	5.01008	38
$\gamma\gamma$:	5.	30
Breakdown of the ρ data sample		
pp:	5.30542	74
$\bar{p}p$:	11.5382	11
π^+p:	8.98072	8
π^-p:	7.56285	30
K^+p:	5.21771	10
K^-p:	5.23565	8

χ^2/dof	=	**0.99**
CL[%]	=	53.59
Name of value	Numerical value	Error value
s_0	79.371146	30.364068
η_1	0.21134153	0.0079899165
η_2	0.54379057	0.0063134496
δ	0.0034613974	0.000040046313
B_{pp}	6.6282714	0.2193893
$B_{\pi p}$	4.5169301	0.1758988
B_{Kp}	4.2433142	0.18543239
$B_{\Sigma p}$	7.0077696	0.45733392
Y_{pp1}	104.68182	2.8145916
Y_{pp2}	33.233187	0.955194
$Y_{\pi p1}$	59.961722	2.2920277
$Y_{\pi p2}$	5.7676909	0.16148659
Y_{Kp1}	48.356988	2.4200267
Y_{Kp2}	13.378884	0.37841563
$Y_{\Sigma p1}$	80.700378	6.5379733
$Y_{\Sigma p2}$	-10.906282	22.608186
$Y_{\gamma p1}$	0.28772569	0.012242677
$Y_{\gamma\gamma 1}$	0.00075115814	0.000052959407

Model quality indicators:

	A^M	C^M_1	C^M_2	U^M	R^M_1	R^M_2	S^M_1	S^M_2
RRL(18)	1.823	53.59	77.18	16.73	34.11	0.686	0.217	0.00052

Repository:

computer - **NPT1**

`directory - d:\MathemD\Kolja\Evela\Gauron\(RR)L(18)`

Appendix RRL(18) (№5) 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	0.88	0.98	0.99	0.81	0.73	0.62	0.41	0.77	0.97

	ρ data					
Reaction	pp	$\bar{p}p$	π^+p	π^-p	K^+p	K^-p
χ^2/NoP	1.56	0.47	1.91	1.52	1.25	1.22

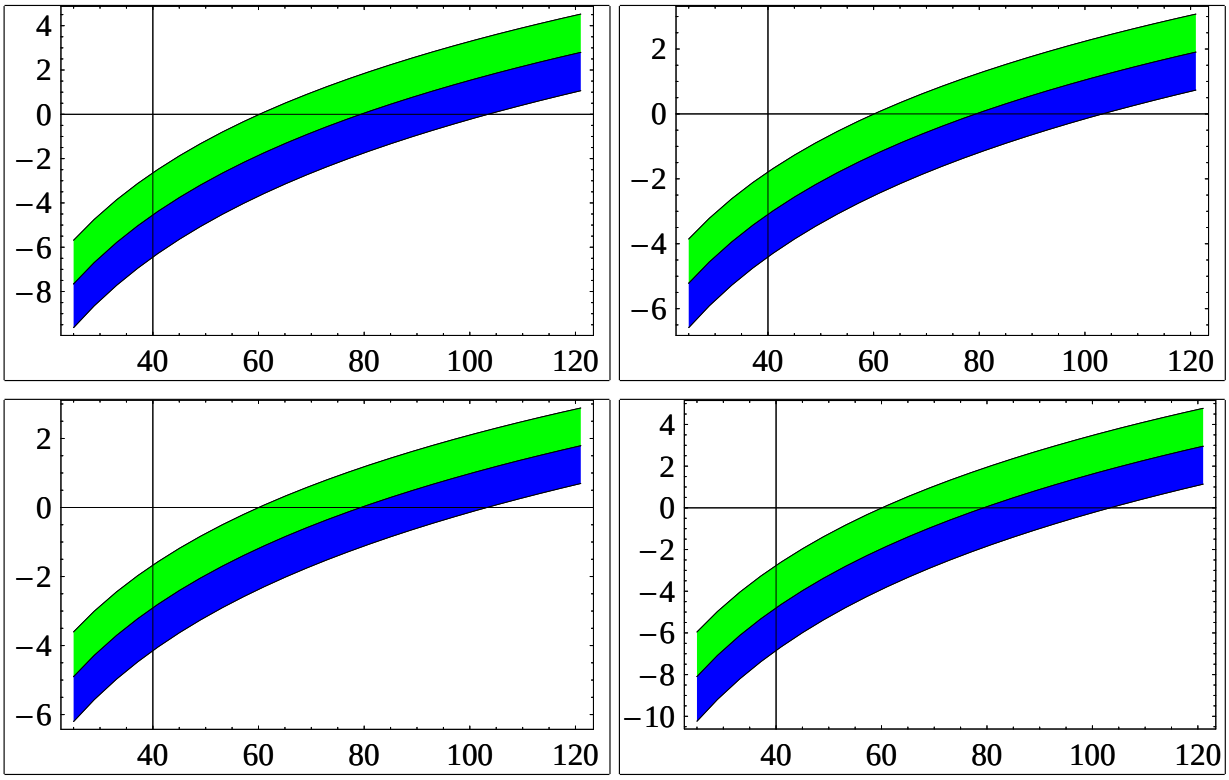


Figure 37: Pomeron contribution for pp, π^+p, K^+p and Σ^-p [mb] (Axis X – s [GeV^2])

	s_0	η_1	η_2	δ	B_{pp}	$B_{\pi p}$	B_{Kp}	$B_{\Sigma p}$	Y_{pp1}	Y_{pp2}	$Y_{\pi p1}$	$Y_{\pi p2}$	Y_{Kp1}	Y_{Kp2}	$Y_{\Sigma p1}$	$Y_{\Sigma p2}$	$Y_{\gamma p1}$	$Y_{\gamma\gamma 1}$
s_0	100	**-99.2**	-20.8	59.4	**99.3**	**99.2**	**99.4**	59.6	**98.6**	-21.8	**99.4**	-19.8	**99.6**	-18.8	65.5	-6.21	**99.4**	**91.9**
η_1	**-99.2**	100	25	-58.3	**-97.2**	**-96.9**	**-97.6**	-58.9	**-95.7**	26.6	**-97.1**	23.9	**-97.7**	22.9	-63.9	5.76	**-97.3**	**-90.5**
η_2	-20.8	25	100	-4.64	-19.5	-16.3	-18	-11.9	-14.4	**97.4**	-16.8	88.3	-17.8	**94.5**	-10.1	0.529	-17.2	-17.6
δ	59.4	-58.3	-4.64	100	58.8	59.5	59.4	35.5	59.4	-4.69	59.5	-4.91	59.6	-3.82	39.3	-3.81	58.6	48.5
B_{pp}	**99.3**	**-97.2**	-19.5	58.8	100	**99.7**	**99.6**	59.4	**99.6**	-20.2	**99.9**	-18.3	**99.8**	-17.4	65.9	-6.5	**99.8**	**91.9**
B_{pip}	**99.2**	**-96.9**	-16.3	59.5	**99.7**	100	**99.6**	59.4	**99.7**	-16.8	**99.9**	-15.4	**99.8**	-14.4	65.9	-6.52	**99.8**	**91.8**
B_{Kp}	**99.4**	**-97.6**	-18	59.4	**99.6**	**99.6**	100	59.5	**99.4**	-18.6	**99.8**	-17.1	**99.8**	-15.8	65.8	-6.43	**99.7**	**91.8**
$B_{\Sigma p}$	59.6	-58.9	-11.9	35.5	59.4	59.4	59.5	100	59.1	-12.4	59.5	-11.3	59.6	-10.7	-16.2	66.7	59.5	54.9
Y_{pp1}	**98.6**	**-95.7**	-14.4	59.4	**99.6**	**99.7**	**99.4**	59.1	100	-14.4	**99.8**	-13.7	**99.7**	-12.5	66	-6.63	**99.7**	**91.5**
Y_{pp2}	-21.8	26.6	**97.4**	-4.69	-20.2	-16.8	-18.6	-12.4	-14.4	100	-17.4	86.2	-18.4	**92.1**	-10.5	0.448	-17.7	-18.3
$Y_{\pi p1}$	**99.4**	**-97.1**	-16.8	59.5	**99.9**	**99.9**	**99.8**	59.5	**99.8**	-17.4	100	-16.1	100	-14.9	66	-6.51	**99.9**	**91.9**
$Y_{\pi p2}$	-19.8	23.9	88.3	-4.91	-18.3	-15.4	-17.1	-11.3	-13.7	86.2	-16.1	100	-16.9	83.4	**-9.65**	0.468	-16.3	-16.7
Y_{Kp1}	**99.6**	**-97.7**	-17.8	59.6	**99.8**	**99.8**	**99.8**	59.6	**99.7**	-18.4	100	-16.9	100	-15.9	66	-6.45	**99.9**	**92**
Y_{Kp2}	-18.8	22.9	**94.5**	-3.82	-17.4	-14.4	-15.8	-10.7	-12.5	**92.1**	-14.9	83.4	-15.9	100	-8.9	0.416	-15.2	-15.7
$Y_{\Sigma p1}$	65.5	-63.9	-10.1	39.3	65.9	65.9	65.8	-16.2	66	-10.5	66	**-9.65**	66	-8.9	100	-78.8	66	60.6
$Y_{\Sigma p2}$	-6.21	5.76	0.529	-3.81	-6.5	-6.52	-6.43	66.7	-6.63	0.448	-6.51	0.468	-6.45	0.416	-78.8	100	-6.49	-5.87
$Y_{\gamma p1}$	**99.4**	**-97.3**	-17.2	58.6	**99.8**	**99.8**	**99.7**	59.5	**99.7**	-17.7	**99.9**	-16.3	**99.9**	-15.2	66	-6.49	100	**92**
$Y_{\gamma\gamma 1}$	**91.9**	**-90.5**	-17.6	48.5	**91.9**	**91.8**	**91.8**	54.9	**91.5**	-18.3	**91.9**	-16.7	**92**	-15.7	60.6	-5.87	**92**	100

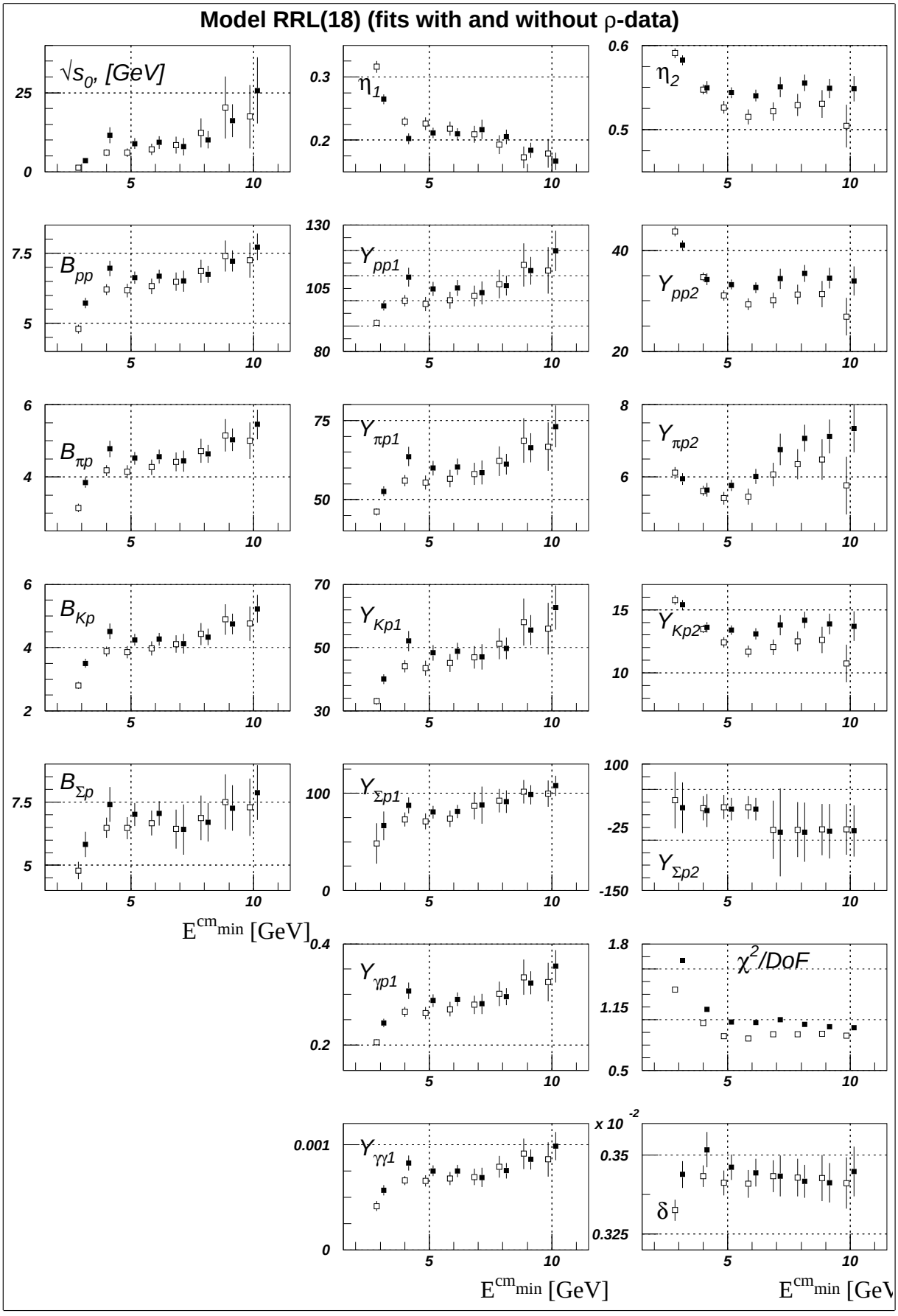
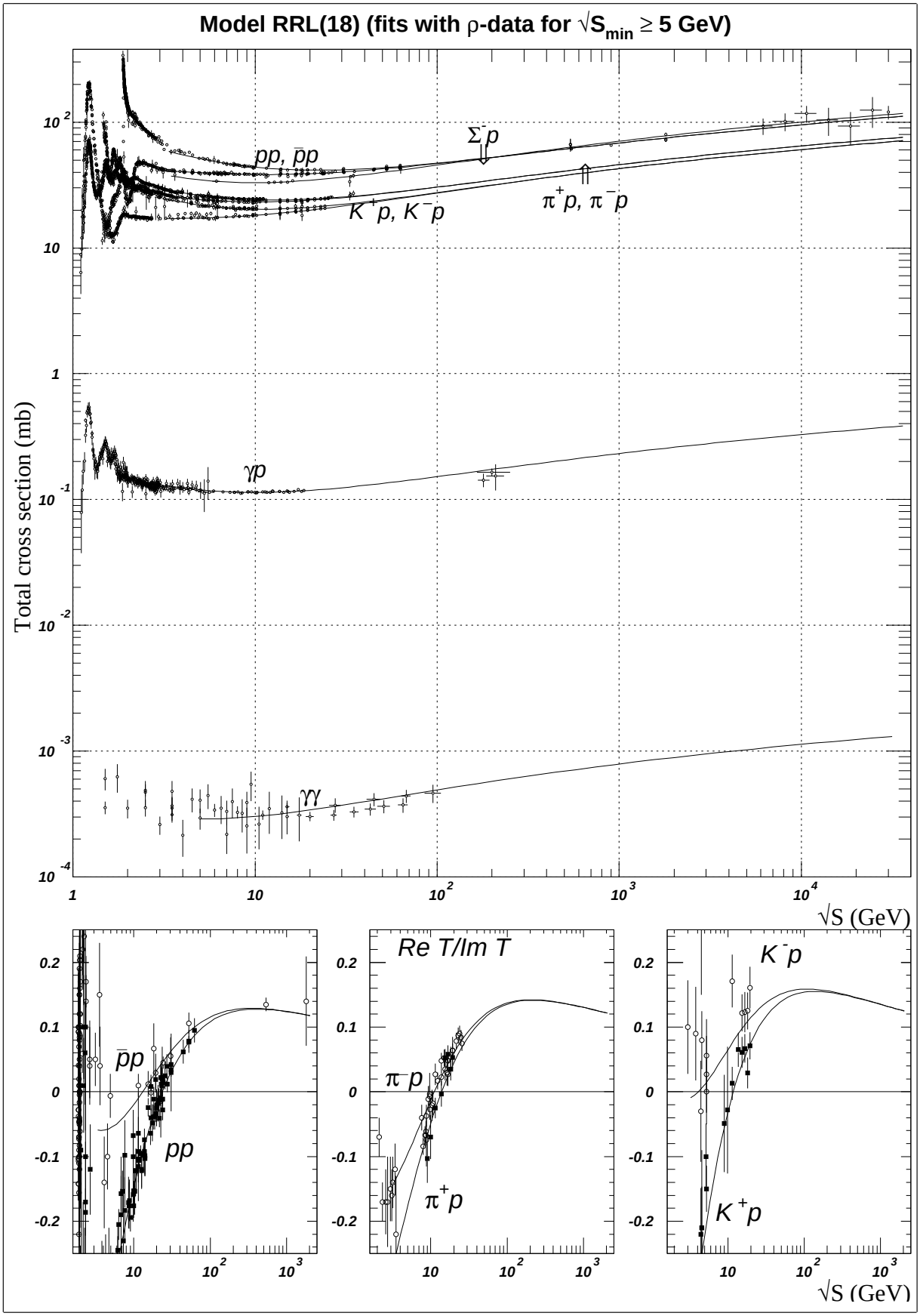


Figure 38: Bold (empty) symbol marks fits with (without) $\boldsymbol{\rho}$ data and are shifted to the right (left) in energy slightly for the cleareness


Model RRL(18) (fits with ρ-data for √S_min ≥ 5 GeV)
Total cross section (mb)
pp, p̄p
Σ⁻p
K⁺p, K⁻p
π⁺p, π⁻p
γp
γγ
√S (GeV)
Re T/Im T
p̄p
pp
π⁻p
π⁺p
K⁻p
K⁺p
√S (GeV)