$$
\left\{
\begin{array}{lcl}
\sigma_{pp} & = & 9\cdot(A+B\cdot\ln\ s+C\cdot\ln^2 s)+Y_1^{pp}s^{-\eta_1}-Y_2^{pp}s^{-\eta_2},\\
\sigma_{\bar{p}p} & = & 9\cdot(A+B\cdot\ln\ s+C\cdot\ln^2 s)+Y_1^{pp}s^{-\eta_1}+Y_2^{pp}s^{-\eta_2},\\
\sigma_{\pi^+p} & = & 6\cdot\lambda_m\cdot(A+B\cdot\ln\ s+C\cdot\ln^2 s)+Y_1^{\pi p}s^{-\eta_1}-Y_2^{\pi p}s^{-\eta_2},\\
\sigma_{\pi^-p} & = & 6\cdot\lambda_m\cdot(A+B\cdot\ln\ s+C\cdot\ln^2 s)+Y_1^{\pi p}s^{-\eta_1}+Y_2^{\pi p}s^{-\eta_2},\\
\sigma_{K^+p} & = & 3\cdot\lambda_m\cdot(1+\lambda_s)(A+B\cdot\ln\ s+C\cdot\ln^2 s)+Y_1^{Kp}s^{-\eta_1}-Y_2^{Kp}s^{-\eta_2},\\
\sigma_{K^-p} & = & 3\cdot\lambda_m\cdot(1+\lambda_s)(A+B\cdot\ln\ s+C\cdot\ln^2 s)+Y_1^{Kp}s^{-\eta_1}+Y_2^{Kp}s^{-\eta_2},\\
\sigma_{\gamma p} & = & 6\cdot\lambda_m\cdot\delta\cdot(A+B\cdot\ln\ s+C\cdot\ln^2 s)+Y_1^{\gamma p}s^{-\eta_1},\\
\sigma_{\gamma\gamma} & = & 4\cdot\lambda_m^2\cdot\delta^2\cdot(A+B\cdot\ln\ s+C\cdot\ln^2 s)+Y_1^{\gamma\gamma}s^{-\eta_1},\\
\sigma_{\Sigma^-p} & = & (6+3\lambda_s)\cdot(A+B\cdot\ln\ s+C\cdot\ln^2 s)+Y_1^{\Sigma p}s^{-\eta_1}-Y_2^{\Sigma p}s^{-\eta_2}.
\end{array}
\right.
$$

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

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:

$\eta_1, \eta_2, \delta, \lambda_m, \lambda_s$ – dimensionless
$A, B, C, Y_{1,2}^{pp}, Y_{1,2}^{\pi p}, Y_{1,2}^{Kp}, Y_{1,2}^{\Sigma p}, Y_1^{\gamma p}, Y_1^{\gamma\gamma}$ – [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	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	1.32	0.99	0.85	0.83	0.87	0.87	0.86	0.83
χ^2/dof: ρ included	1.63	1.13	0.996	0.99	1.017	0.97	0.94	0.93

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
$\bar{p}p$:	5.15690	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	=	**0.97**
CL[%]	=	64.2
Name of value	Numerical value	Error value
η_1	0.20641782	0.010884864
η_2	0.5428034	0.0064143149
λ_s	0.8845607	0.014172301
λ_m	1.025892	0.0090176125
δ	0.0050831683	0.00004929446
B	0.79164674	0.090048287
A	-3.7258004	0.89981109
C	-0.0018160896	0.0028144971
Y_{pp1}	109.05955	7.5702999
Y_{pp2}	33.077245	0.96873121
$Y_{\pi p1}$	63.199232	5.7042522
$Y_{\pi p2}$	5.7489966	0.16219719
Y_{Kp1}	51.579971	5.7534723
Y_{Kp2}	13.329098	0.3811168
$Y_{\gamma p1}$	0.30457741	0.029822716
$Y_{\gamma\gamma 1}$	0.00081371076	0.00011445243
$Y_{\Sigma p1}$	93.17898	8.1691525
$Y_{\Sigma p2}$	24.200536	10.618283

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
RR(PL2)^{qc}(18)	1.836	52.08	79.38	18.33	34.11	0.706	0.025	1.061

Repository:

computer - **NPT1**

directory - d:\MathemD\Kolja\Evela\Gauron\(RR)(PL2)qc(18)

	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	0.96	0.82	0.73	0.63	0.58	0.78	0.98

	ρ data					
Reaction	pp	$\bar{p}p$	π^+p	π^-p	K^+p	K^-p
χ^2/NoP	1.56	0.48	1.89	1.49	1.29	1.21

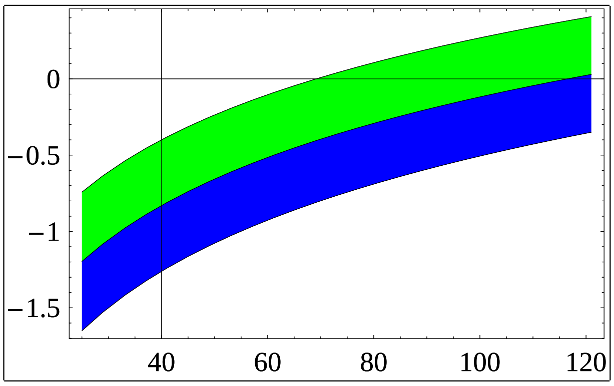


Figure 26: Pomeron contribution for pp [mb] (Axis X – s [GeV^2])

	η_1	η_2	λ_s	λ_m	δ	B	A	C	Y_{pp1}	Y_{pp2}	$Y_{\pi p1}$	$Y_{\pi p2}$	Y_{Kp1}	Y_{Kp2}	$Y_{\gamma p1}$	$Y_{\gamma\gamma 1}$	$Y_{\Sigma p1}$	$Y_{\Sigma p2}$
η_1	**100**	31.2	-88.8	**-93**	-16.1	-87	**94.6**	70.5	**-91.8**	33.1	**-93.3**	26.8	**-94.1**	27.6	**-93.6**	**-93.3**	**-90.6**	-3.96
η_2	31.2	**100**	-31.3	-12	-8.6	-24.1	26.6	19.4	-23.7	**97.5**	-24.8	88.5	-25.3	**94.6**	-25	-25.5	-24	4.61
λ_s	-88.8	-31.3	**100**	75.7	19.6	75	-82.4	-59.7	79.5	-33.1	80.9	-27.7	81.9	-27	81.3	81.3	77.8	0.0383
λ_m	**-93**	-12	75.7	**100**	9.07	83.4	**-90.2**	-67.6	88.8	-12.5	89.9	-8.88	**90.5**	**-9.27**	**90.1**	89.3	87.9	6.89
δ	-16.1	-8.6	19.6	9.07	**100**	13.4	-14.7	-10.9	14	-9.06	14.3	-7.95	14.5	-7.89	14.6	12.1	13.7	-0.549
B	-87	-24.1	75	83.4	13.4	**100**	**-98.2**	**-96**	**99.2**	-25.5	**98.7**	-18.7	**98.3**	-20.6	**98.6**	**96.6**	**96.1**	3.67
A	**94.6**	26.6	-82.4	**-90.2**	-14.7	**-98.2**	**100**	89.2	**-99.7**	28.1	**-99.9**	21.4	**-100**	22.9	**-99.9**	**-98.5**	**-97.2**	-4.04
C	70.5	19.4	-59.7	-67.6	-10.9	**-96**	89.2	**100**	**-91.8**	20.6	**-90.4**	14.1	-89.4	16.3	**-90**	-87.3	-88	-2.81
Y_{pp1}	**-91.8**	-23.7	79.5	88.8	14	**99.2**	**-99.7**	**-91.8**	**100**	-24.9	**99.9**	-18.6	**99.8**	-20.2	**99.9**	**98.1**	**97.3**	4.18
Y_{pp2}	33.1	**97.5**	-33.1	-12.5	-9.06	-25.5	28.1	20.6	-24.9	**100**	-26.1	86.4	-26.7	**92.2**	-26.4	-26.9	-25.2	4.75
$Y_{\pi p1}$	**-93.3**	-24.8	80.9	89.9	14.3	**98.7**	**-99.9**	**-90.4**	**99.9**	-26.1	**100**	-19.7	**100**	-21.2	**100**	**98.4**	**97.3**	4.18
$Y_{\pi p2}$	26.8	88.5	-27.7	-8.88	-7.95	-18.7	21.4	14.1	-18.6	86.4	-19.7	**100**	-20.2	83.7	-19.9	-20.5	-19	4.27
Y_{Kp1}	**-94.1**	-25.3	81.9	**90.5**	14.5	**98.3**	**-100**	-89.4	**99.8**	-26.7	**100**	-20.2	**100**	-21.8	**100**	**98.4**	**97.3**	4.18
Y_{Kp2}	27.6	**94.6**	-27	-9.27	-7.89	-20.6	22.9	16.3	-20.2	**92.2**	-21.2	83.7	-21.8	**100**	-21.4	-22	-20.6	4.34
$Y_{\gamma p1}$	**-93.6**	-25	81.3	**90.1**	14.6	**98.6**	**-99.9**	**-90**	**99.9**	-26.4	**100**	-19.9	**100**	-21.4	**100**	**98.4**	**97.3**	4.18
$Y_{\gamma\gamma 1}$	**-93.3**	-25.5	81.3	89.3	12.1	**96.6**	**-98.5**	-87.3	**98.1**	-26.9	**98.4**	-20.5	**98.4**	-22	**98.4**	**100**	**95.7**	4.09
$Y_{\Sigma p1}$	**-90.6**	-24	77.8	87.9	13.7	**96.1**	**-97.2**	-88	**97.3**	-25.2	**97.3**	-19	**97.3**	-20.6	**97.3**	**95.7**	**100**	26.7
$Y_{\Sigma p2}$	-3.96	4.61	0.0383	6.89	-0.549	3.67	-4.04	-2.81	4.18	4.75	4.18	4.27	4.18	4.34	4.18	4.09	26.7	**100**

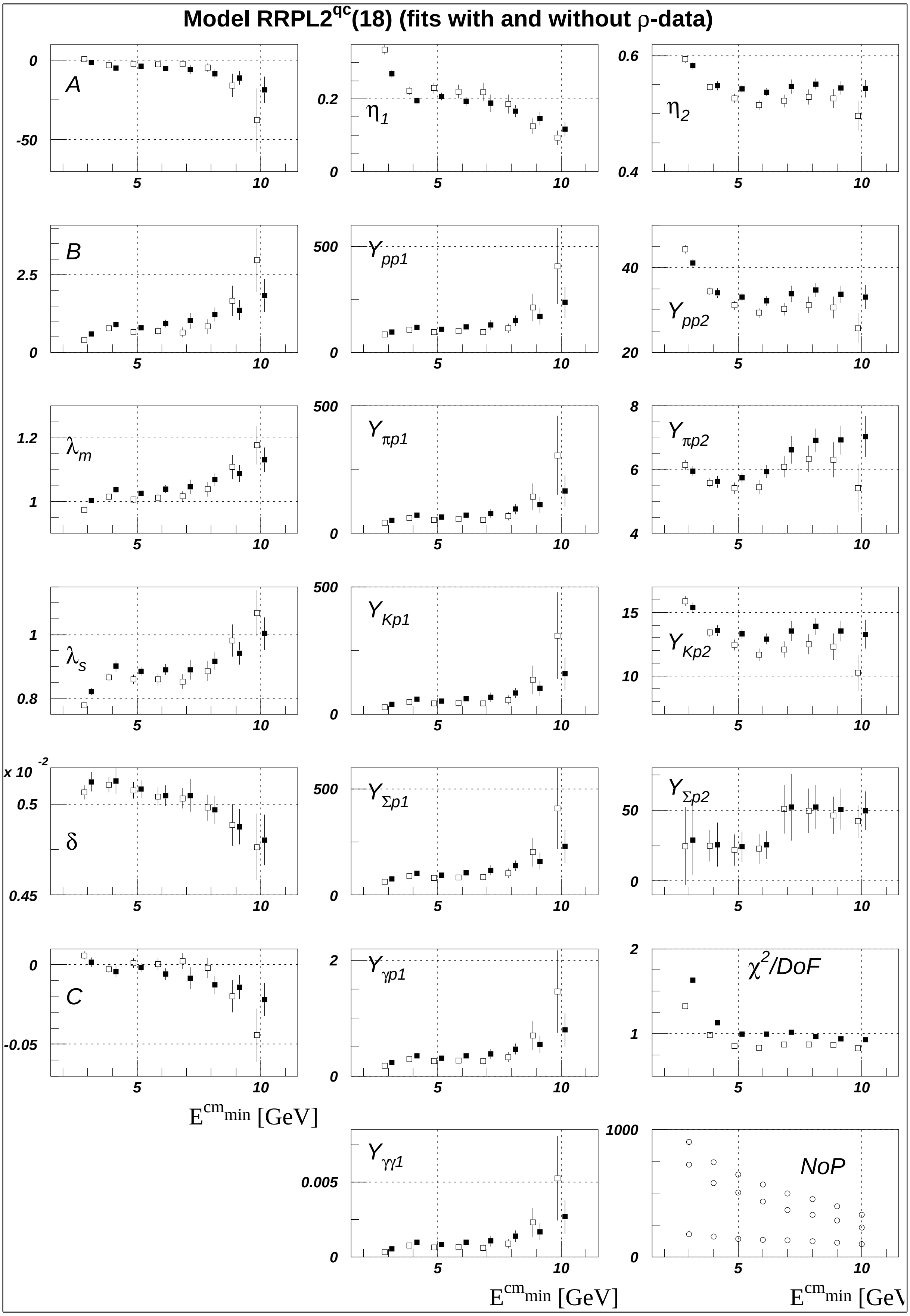
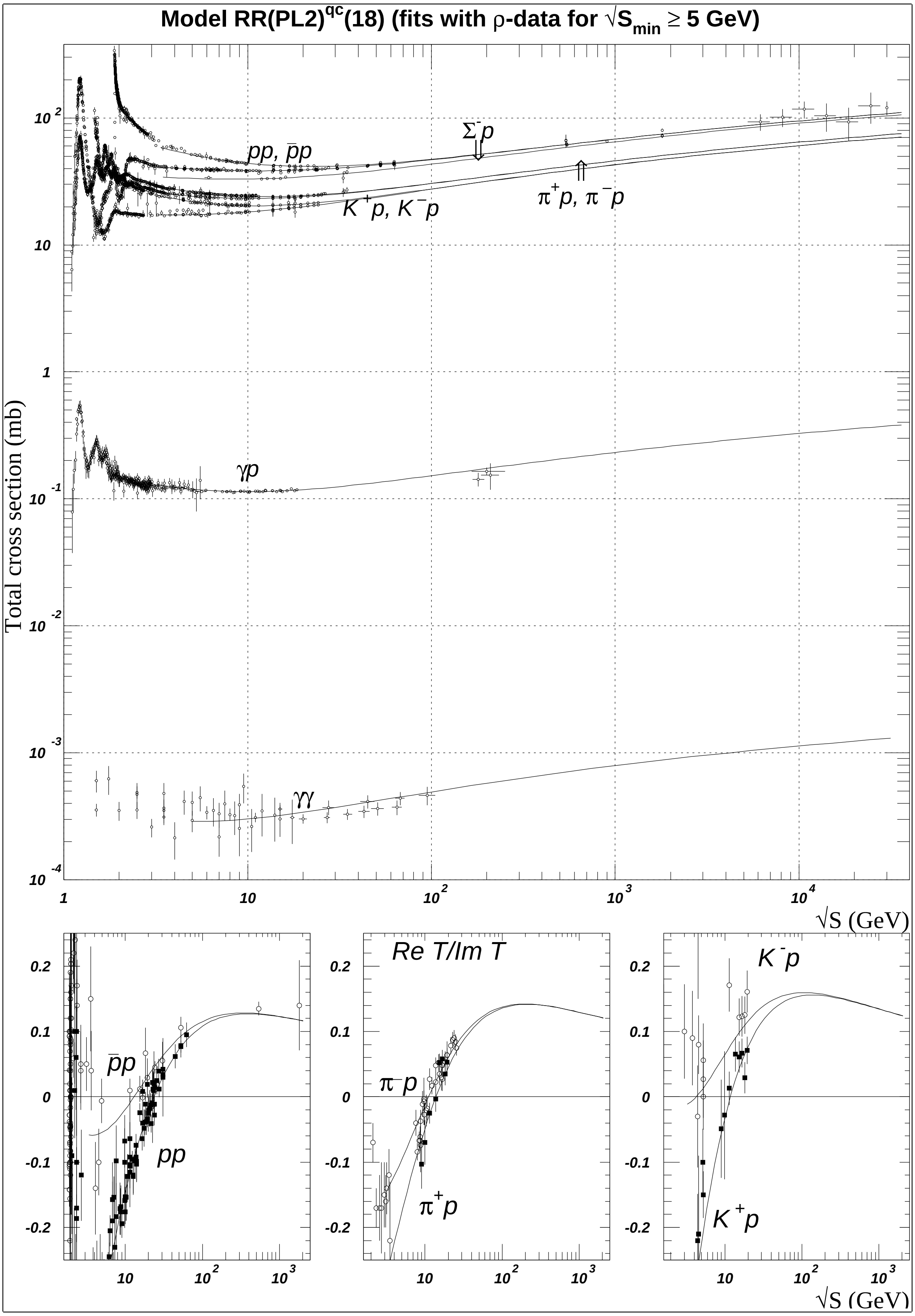


Figure 27: Bold (empty) symbol marks fits with (without) $\boldsymbol{\rho}$ data and are shifted to the right (left) in energy slightly for the cleareness



Model RR(PL2)^qc(18) (fits with ρ-data for √S_min ≥ 5 GeV)
Total cross section (mb)
pp, p̄p
Σ̄p
π⁺p, π⁻p
K⁺p, K⁻p
γp
γγ
√S (GeV)
p̄p
pp
Re T/Im T
π⁻p
π⁺p
K⁻p
K⁺p
√S (GeV)