

$$\left\{ \begin{array}{l}
\sigma_{pp} = Z_{pp} + B \ln^2 \left(\frac{s}{s_0} \right) + Y_1^{pp} s^{-\eta} - 5Y_2^{\pi p} s^{-\eta}, \\
\sigma_{\bar{p}p} = Z_{pp} + B \ln^2 \left(\frac{s}{s_0} \right) + Y_1^{pp} s^{-\eta} + 5Y_2^{\pi p} s^{-\eta}, \\
\sigma_{\pi+p} = R_{\pi p} Z_{pp} + B \ln^2 \left(\frac{s}{s_0} \right) + Y_1^{\pi p} s^{-\eta} - Y_2^{\pi p} s^{-\eta}, \\
\sigma_{\pi-p} = R_{\pi p} Z_{pp} + B \ln^2 \left(\frac{s}{s_0} \right) + Y_1^{\pi p} s^{-\eta} + Y_2^{\pi p} s^{-\eta}, \\
\sigma_{K+p} = R_{Kp} Z_{pp} + B \ln^2 \left(\frac{s}{s_0} \right) + Y_1^{Kp} s^{-\eta} - 2Y_2^{\pi p} s^{-\eta}, \\
\sigma_{K-p} = R_{Kp} Z_{pp} + B \ln^2 \left(\frac{s}{s_0} \right) + Y_1^{Kp} s^{-\eta} + 2Y_2^{\pi p} s^{-\eta}, \\
\sigma_{\gamma p} = \delta Z_{pp} + \delta B \ln^2 \left(\frac{s}{s_0} \right) + Y_1^{\gamma p} s^{-\eta}, \\
\sigma_{\gamma\gamma} = \delta^2 Z_{pp} + \delta^2 B \ln^2 \left(\frac{s}{s_0} \right) + Y_1^{\gamma\gamma} s^{-\eta}, \\
\sigma_{\Sigma-p} = R_{\Sigma p} Z_{pp} + B \ln^2 \left(\frac{s}{s_0} \right) + Y_1^{\Sigma p} s^{-\eta}. \quad \blacksquare \\
\rho_{pp}\sigma_{pp} = \pi B \ln \left(\frac{s}{s_0} \right) - \frac{Y_1^{pp} s^{-\eta}}{\tan \left[\frac{1-\eta}{2} \pi \right]} - \frac{5Y_2^{\pi p} s^{-\eta}}{\cot \left[\frac{1-\eta}{2} \pi \right]}, \\
\rho_{\bar{p}p}\sigma_{\bar{p}p} = \pi B \ln \left(\frac{s}{s_0} \right) - \frac{Y_1^{pp} s^{-\eta}}{\tan \left[\frac{1-\eta}{2} \pi \right]} + \frac{5Y_2^{\pi p} s^{-\eta}}{\cot \left[\frac{1-\eta}{2} \pi \right]}, \\
\rho_{\pi+p}\sigma_{\pi+p} = \pi B \ln \left(\frac{s}{s_0} \right) - \frac{Y_1^{\pi p} s^{-\eta}}{\tan \left[\frac{1-\eta}{2} \pi \right]} - \frac{Y_2^{\pi p} s^{-\eta}}{\cot \left[\frac{1-\eta}{2} \pi \right]}, \\
\rho_{\pi-p}\sigma_{\pi-p} = \pi B \ln \left(\frac{s}{s_0} \right) - \frac{Y_1^{\pi p} s^{-\eta}}{\tan \left[\frac{1-\eta}{2} \pi \right]} + \frac{Y_2^{\pi p} s^{-\eta}}{\cot \left[\frac{1-\eta}{2} \pi \right]}, \\
\rho_{K+p}\sigma_{K+p} = \pi B \ln \left(\frac{s}{s_0} \right) - \frac{Y_1^{\pi p} s^{-\eta}}{\tan \left[\frac{1-\eta}{2} \pi \right]} - \frac{Y_2^{Kp} s^{-\eta}}{\cot \left[\frac{1-\eta}{2} \pi \right]}, \\
\rho_{K-p}\sigma_{K-p} = \pi B \ln \left(\frac{s}{s_0} \right) - \frac{Y_1^{\pi p} s^{-\eta}}{\tan \left[\frac{1-\eta}{2} \pi \right]} + \frac{Y_2^{Kp} s^{-\eta}}{\cot \left[\frac{1-\eta}{2} \pi \right]}.
\end{array} \right.$$

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

Adjustable parameters naming. In total 15 parameters used:

$$\begin{aligned} \eta, \delta, R_{\pi p}, R_{Kp}, R_{\Sigma p} &- \text{dimensionless} \\ Z_{pp}, B &- [\text{mb}] \\ s_0 &- [\text{GeV}]^2 \\ Y_1^{pp}, Y_{1,2}^{\pi p}, Y_1^{Kp}, Y_1^{\Sigma p}, Y_1^{\gamma p}, Y_1^{\gamma\gamma} &- [\text{mb}] \end{aligned}$$

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

$E_{\text{cm}}^{\text{min}}$ [GeV]	3	4	5	6	7	8	9	10
N_{dof} : ρ excluded	711	566	492	419	354	316	270	215
N_{dof} : ρ included	889	727	633	554	483	438	382	314
χ^2/dof : ρ excluded	2.08	1.19	0.90	0.82	0.83	0.83	0.82	0.75
χ^2/dof : ρ included	2.38	1.37	1.06	1.01	0.98	0.93	0.93	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	χ^2/dof	=	0.98
Breakdown of the CS data sample			CL[%]	=	61.92
			Name of value	Numerical value	Error value
pp :	7.11215	84	η	0.54348946	0.0081935994
$\bar{p}p$:	7.30724	49	$R_{\pi p}$	0.59298921	0.0022878054
π^+p :	7.56285	29	R_{Kp}	0.50671127	0.0027868768
π^-p :	7.07441	71	$R_{\Sigma p}$	0.91666356	0.015165609
K^+p :	7.57813	28	δ	0.0030459166	0.000015472046
K^-p :	7.26205	44	B	0.31175883	0.0089639766
Σ^-p :	11.922	8	Z_{pp}	36.784336	0.22246135
γp :	7.27053	31	s_0	39.731955	5.147106
$\gamma\gamma$:	7.	25	Y_{pp1}	48.60371	1.6684776
Breakdown of the ρ data sample			$Y_{\pi p1}$	19.114537	1.394333
pp :	7.12795	67	$Y_{\pi p2}$	6.5969507	0.25542847
$\bar{p}p$:	11.5382	11	Y_{Kp1}	4.5316087	1.6383177
π^+p :	8.98072	8	$Y_{\Sigma p1}$	-18.686719	9.952022
π^-p :	7.56285	30	$Y_{\gamma p1}$	0.017369458	0.0085396805
K^+p :	8.99347	8	$Y_{\gamma\gamma1}$	-0.00042595681	0.00013314926
K^-p :	11.5102	5			

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
$(RR_c)^d PL2_u(15)$	1.885	61.92	83.38	16.26	31.13	0.876	0.467	0.795

Repository:

computer - NPT1

directory - d:\MathemD\Kolja\Evela\Gauron\RRc)dPL2u(15)

Appendix $(RR_c)^{dPL2_u(15)} (N=29) \chi^2/\text{NoP}$ 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	1.03	1.13	0.32	0.91	0.44	0.77	0.43	0.59	0.65

		ρ data				
Reaction	pp	$\bar{p}p$	π^+p	π^-p	K^+p	K^-p
χ^2/NoP	1.6	0.59	1.71	1.08	0.69	1.57

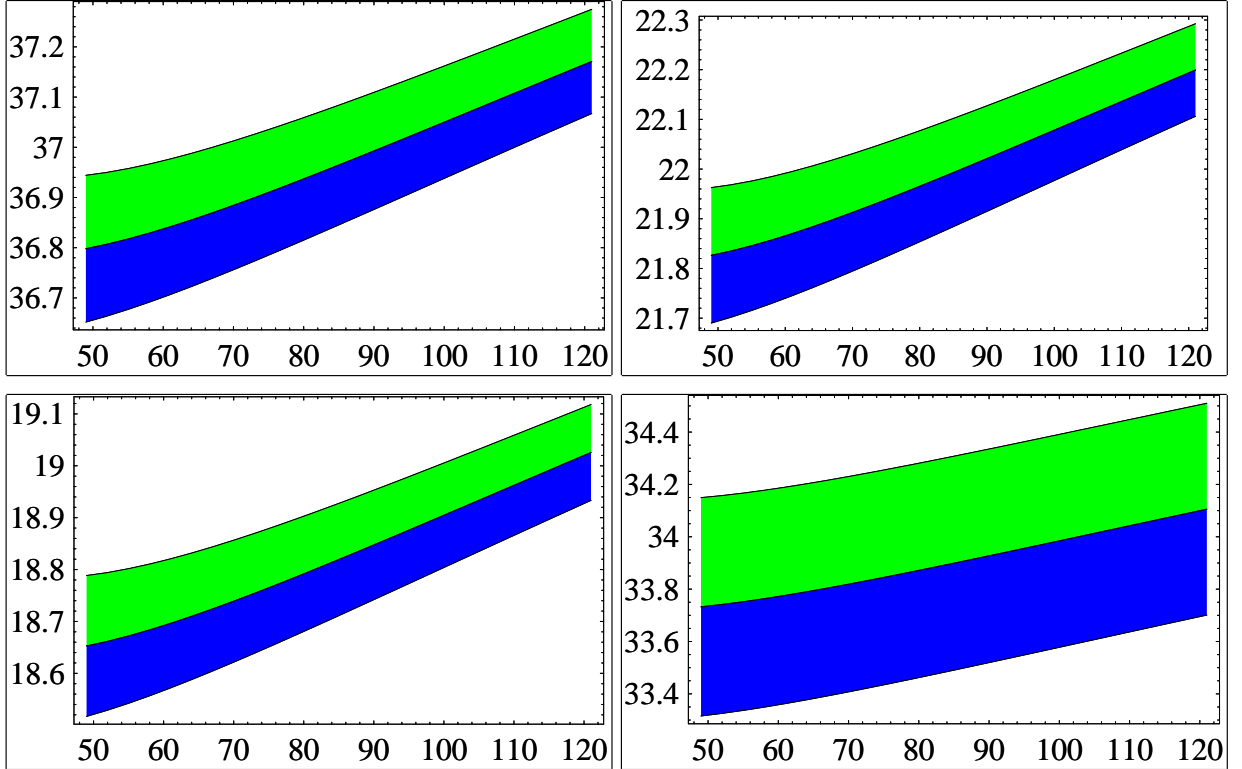


Figure 7: Pomeron contribution for pp , π^+p , K^+p and Σ^-p [mb] (Axis $X - s$ [GeV²])

Appendix (RR_c)^dPL2_u(15) (N^o29) Correlation matrix

	η	$R_{\pi\pi}$	R_{Kp}	$R_{\Sigma p}$	δ	B	Z_{pp}	s_0	Y_{pp1}	$Y_{\pi p1}$	$Y_{\pi p2}$	Y_{Kp1}	$Y_{\Sigma p1}$	$Y_{\gamma p1}$	$Y_{\gamma\gamma1}$
η	100	51.2	36.4	-3.89	-13.8	26.6	55.9	42.5	41.9	-24.7	98.7	-41.8	-15.7	-21.8	-13.5
$R_{\pi\pi}$	51.2	100	88.3	2.66	-4.87	83.6	86.2	91.5	-36	-90.2	50.4	-86.9	-20.3	-47.9	-14.3
R_{Kp}	36.4	88.3	100	3.28	-4.62	85.7	87	93.2	-52.4	-89.4	36.2	-97.2	-19.7	-49.5	-12.8
$R_{\Sigma p}$	-3.89	2.66	3.28	100	1.24	2.89	0.67	2.4	-4.15	-3.24	-3.91	-2.24	-95.7	-1.27	-0.012
δ	-13.8	-4.87	-4.62	1.24	100	-2.09	-13.4	-7.66	2.06	6.82	-13.8	8.97	3.01	-73.7	-35
B	26.6	83.6	85.7	2.89	-2.09	100	80	92.8	-53.8	-84.7	26.3	-82.8	-16.7	-46.4	-11.7
Z_{pp}	55.9	86.2	87	0.67	-13.4	80	100	95.7	-50.4	-90.7	55.4	-94.2	-22.5	-52.4	-13.9
s_0	42.5	91.5	93.2	2.4	-7.66	92.8	95.7	100	-56.7	-94.6	42	-95.2	-21.2	-53	-13.7
Y_{pp1}	41.9	-36	-52.4	-4.15	2.06	-53.8	-50.4	-56.7	100	70.3	41.8	56.7	8.08	33.2	0.734
$Y_{\pi p1}$	-24.7	-90.2	-89.4	-3.24	6.82	-84.7	-90.7	-94.6	70.3	100	-24.8	92.3	19.6	51.7	11.3
$Y_{\pi p2}$	98.7	50.4	36.2	-3.91	-3.91	100	-24.8	100	-24.8	100	100	-41.9	-15.5	-21.6	-13.2
Y_{Kp1}	-41.8	-86.9	-97.2	-19.7	8.97	-82.8	-94.2	-95.2	56.7	92.3	-41.9	100	21.1	51.7	13
$Y_{\Sigma p1}$	-15.7	-20.3	-19.7	-95.7	3.01	-16.7	-22.5	-21.2	8.08	19.6	-15.5	21.1	100	11.6	3.47
$Y_{\gamma p1}$	-21.8	-47.9	-49.5	-1.27	-73.7	-46.4	-52.4	-53	33.2	51.7	-21.6	51.7	11.6	100	37.4
$Y_{\gamma\gamma1}$	-13.5	-14.3	-12.8	-0.012	-35	-11.7	-13.9	-13.7	0.734	11.3	-13.2	13	3.47	37.4	100

Appendix $(RR_c)^d PL2_u(15)$ ($N=29$) Parameters evolution

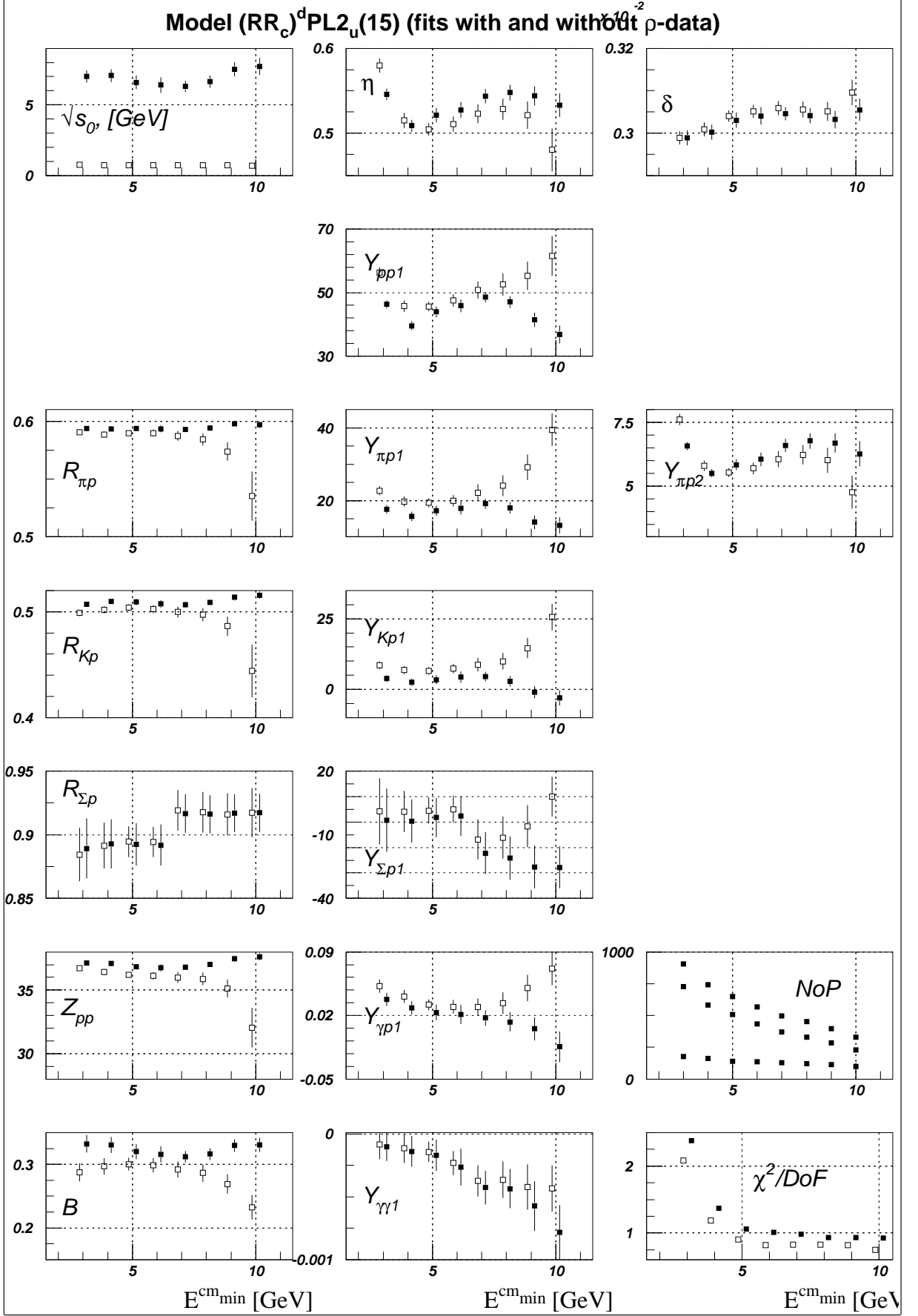


Figure 8: Bold (empty) symbol marks fits with (without) ρ data and are shifted to the right (left) in energy slightly for the cleareness

