

$$\left\{ \begin{array}{l}
\sigma_{pp} = 9B \ln\left(\frac{s}{s_0}\right) + Y_1^{pp} s^{-\eta_1} - 5Y_2^{\pi p} s^{-\eta_2}, \\
\sigma_{\bar{p}p} = 9B \ln\left(\frac{s}{s_0}\right) + Y_1^{pp} s^{-\eta_1} + 5Y_2^{\pi p} s^{-\eta_2}, \\
\sigma_{\pi^+p} = 6\lambda_m B \ln\left(\frac{s}{s_0}\right) + Y_1^{\pi p} s^{-\eta_1} - Y_2^{\pi p} s^{-\eta_2}, \\
\sigma_{\pi^-p} = 6\lambda_m B \ln\left(\frac{s}{s_0}\right) + Y_1^{\pi p} s^{-\eta_1} + Y_2^{\pi p} s^{-\eta_2}, \\
\sigma_{K^+p} = 3\lambda_m(1 + \lambda_s)B \ln\left(\frac{s}{s_0}\right) + Y_1^{Kp} s^{-\eta_1} - 2Y_2^{\pi p} s^{-\eta_2}, \\
\sigma_{K^-p} = 3\lambda_m(1 + \lambda_s)B \ln\left(\frac{s}{s_0}\right) + Y_1^{Kp} s^{-\eta_1} + 2Y_2^{\pi p} s^{-\eta_2}, \\
\sigma_{\gamma p} = 6\lambda_m \delta B \ln\left(\frac{s}{s_0}\right) + Y_1^{\gamma p} s^{-\eta_1}, \\
\sigma_{\gamma\gamma} = 4\lambda_m^2 \delta^2 B \ln\left(\frac{s}{s_0}\right) + Y_1^{\gamma\gamma} s^{-\eta_1}, \\
\sigma_{\Sigma^-p} = (6 + 3\lambda_s)B \ln\left(\frac{s}{s_0}\right) + Y_1^{\Sigma p} s^{-\eta_1} - Y_2^{\Sigma p} s^{-\eta_2}. \quad \blacksquare \\
\rho_{pp}\sigma_{pp} = \frac{9\pi B}{2} - \frac{Y_1^{pp} s^{-\eta_1}}{\tan\left[\frac{1-\eta_1}{2}\pi\right]} - \frac{5Y_2^{\pi p} s^{-\eta_2}}{\cot\left[\frac{1-\eta_2}{2}\pi\right]}, \\
\rho_{\bar{p}p}\sigma_{\bar{p}p} = \frac{9\pi B}{2} - \frac{Y_1^{pp} s^{-\eta_1}}{\tan\left[\frac{1-\eta_1}{2}\pi\right]} + \frac{5Y_2^{\pi p} s^{-\eta_2}}{\cot\left[\frac{1-\eta_2}{2}\pi\right]}, \\
\rho_{\pi^+p}\sigma_{\pi^+p} = \frac{6\pi\lambda_m B}{2} - \frac{Y_1^{\pi p} s^{-\eta_1}}{\tan\left[\frac{1-\eta_1}{2}\pi\right]} - \frac{Y_2^{\pi p} s^{-\eta_2}}{\cot\left[\frac{1-\eta_2}{2}\pi\right]}, \\
\rho_{\pi^-p}\sigma_{\pi^-p} = \frac{6\pi\lambda_m B}{2} - \frac{Y_1^{\pi p} s^{-\eta_1}}{\tan\left[\frac{1-\eta_1}{2}\pi\right]} + \frac{Y_2^{\pi p} s^{-\eta_2}}{\cot\left[\frac{1-\eta_2}{2}\pi\right]}, \\
\rho_{K^+p}\sigma_{K^+p} = \frac{3\pi\lambda_m(1 + \lambda_s)B}{2} - \frac{Y_1^{Kp} s^{-\eta_1}}{\tan\left[\frac{1-\eta_1}{2}\pi\right]} - \frac{2Y_2^{\pi p} s^{-\eta_2}}{\cot\left[\frac{1-\eta_2}{2}\pi\right]}, \\
\rho_{K^-p}\sigma_{K^-p} = \frac{3\pi\lambda_m(1 + \lambda_s)B}{2} - \frac{Y_1^{Kp} s^{-\eta_1}}{\tan\left[\frac{1-\eta_1}{2}\pi\right]} + \frac{2Y_2^{\pi p} s^{-\eta_2}}{\cot\left[\frac{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 15 parameters used:

$$\begin{aligned} \eta_1, \eta_2, \delta, \lambda_m, \lambda_s & - \text{dimensionless} \\ s_0 & - [\text{GeV}^2] \\ B, Y_1^{pp}, Y_{1,2}^{\pi p}, Y_1^{Kp}, Y_{1,2}^{\Sigma p}, Y_1^{\gamma p}, Y_1^{\gamma\gamma} & - [\text{mb}] \end{aligned}$$

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	2.20	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	χ^2/dof	=	0.967
			CL[%]	=	68.31
Breakdown of the CS data sample			Name of value	Numerical value	Error value
pp :	8.21361	78	η_1	0.20535026	0.011453586
$\bar{p}p$:	8.0405	43	η_2	0.5554147	0.0095010532
π^+p :	8.15962	28	λ_s	0.8696815	0.014316707
π^-p :	8.15962	61	λ_m	1.0310923	0.0087706577
K^+p :	8.17372	26	δ	0.0049705775	0.000065135646
K^-p :	8.17372	37	B	0.74989124	0.033304788
Σ^-p :	11.922	8	s_0	101.65274	54.491416
γp :	8.06586	28	Y_{pp1}	106.03196	3.8635402
$\gamma\gamma$:	8.	22	$Y_{\pi p1}$	61.099347	3.2481726
Breakdown of the ρ data sample			$Y_{\pi p2}$	7.0873701	0.32981887
pp :	8.55262	62	Y_{Kp1}	49.771511	3.4104074
$\bar{p}p$:	11.5382	11	$Y_{\gamma p1}$	0.29544148	0.016598856
π^+p :	8.98072	8	$Y_{\gamma\gamma1}$	0.00075290895	0.000073263688
π^-p :	8.36404	28	$Y_{\Sigma p1}$	94.982287	4.8901393
K^+p :	8.99347	8	$Y_{\Sigma p2}$	54.897915	17.878582
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 L ^{qc} (15)	1.823	68.31	79.68	12.48	28.31	0.667	0.525	1.311

Repository:

computer - NPT1

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

Appendix $RR_c L^{qc}(15)$ ($N=7$) 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	1.1	0.35	0.95	0.37	0.68	0.42	0.83	0.75

		ρ data				
Reaction	pp	$\bar{p}p$	π^+p	π^-p	K^+p	K^-p
χ^2/NoP	1.21	0.46	1.78	1.3	0.72	1.94

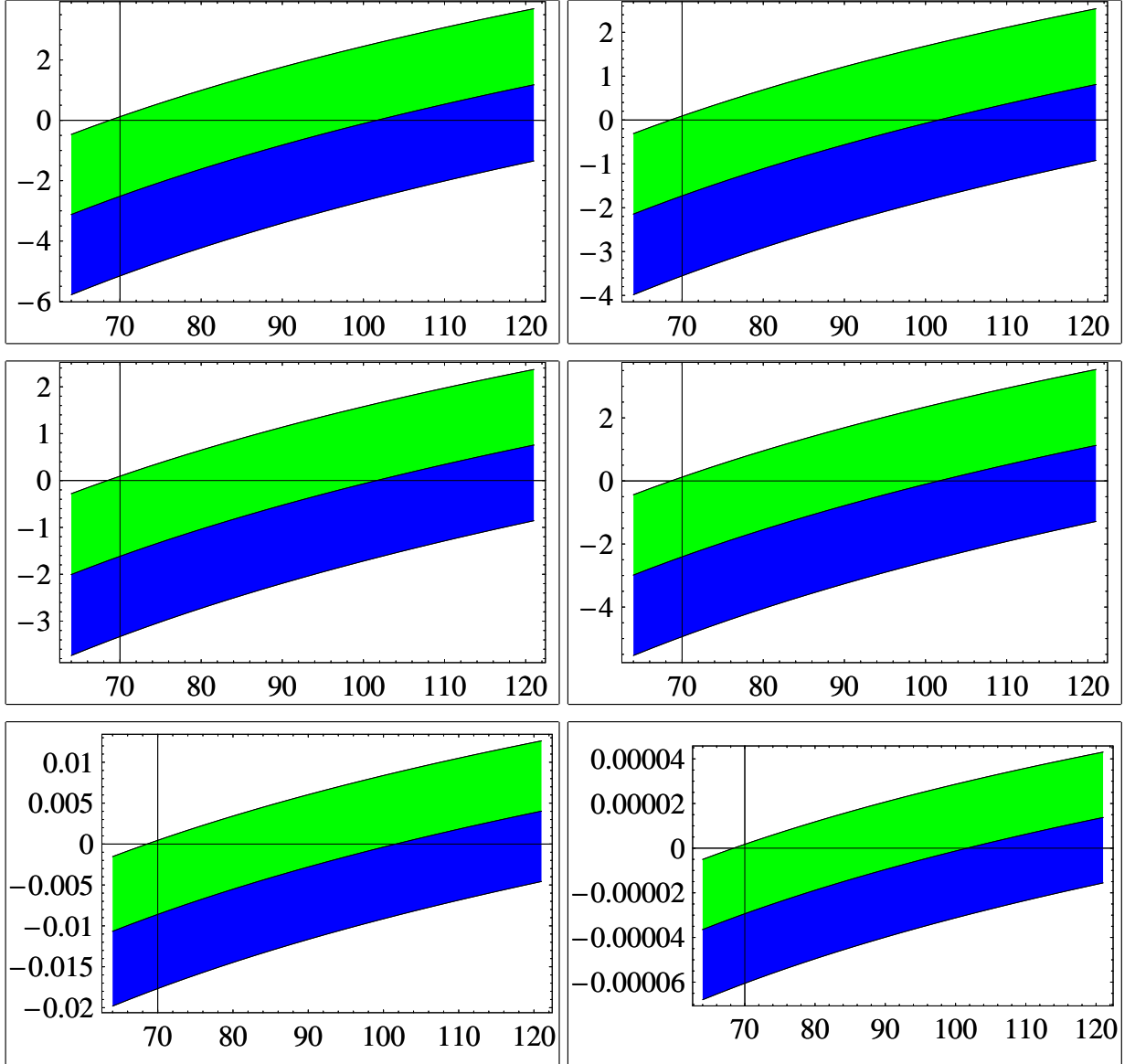


Figure 20: Pomeron contribution for pp , π^+p , K^+p , Σ^-p , γp and $\gamma\gamma$ [mb] (Axis $X - s$ [GeV²])

RR_cL^{qc}(15) (N^o=7) **Correlation matrix**

	η_1	η_2	λ_s	λ_m	δ	B	s_0	Y_{pp1}	$Y_{\pi p1}$	$Y_{\pi p2}$	Y_{Kp1}	$Y_{\gamma p1}$	$Y_{\gamma\gamma 1}$	$Y_{\Sigma p1}$	$Y_{\Sigma p2}$
η_1	100	15.9	-81.3	-88.1	-1.89	-96.9	-99.1	-94.7	-96.6	15.5	-97.3	-96.7	-92.1	-77.3	3.52
η_2	15.9	100	-15.6	6.41	-4.63	-11.5	-12.5	-6.81	-9.09	98.8	-9.87	-9.13	-10.4	-7.98	12
λ_s	-81.3	-15.6	100	60.6	8.51	78.9	80.6	77	78.6	-14.9	78.9	78.6	74.9	59.5	-8.18
λ_m	-88.1	6.41	60.6	100	-6.51	90.5	90.7	91.8	91.6	7.02	91.6	91.7	85.7	76	2.32
δ	-1.89	-4.63	8.51	-6.51	100	0.967	1.32	0.418	0.801	-4.74	0.879	-0.432	-10.1	-0.275	-1.75
B	-96.9	-11.5	78.9	90.5	0.967	100	99.3	99.5	99.9	-11	99.9	99.8	93.7	81	-2.66
s_0	-99.1	-12.5	80.6	90.7	1.32	99.3	100	98.1	99.2	-12.1	99.5	99.2	93.7	80	-2.85
Y_{pp1}	-94.7	-6.81	77	91.8	0.418	99.5	98.1	100	99.8	-6.27	99.5	99.7	93.1	81.3	-1.7
$Y_{\pi p1}$	-96.6	-9.09	78.6	91.6	0.801	99.9	99.2	99.8	100	-8.65	99.9	99.9	93.7	81.2	-2.16
$Y_{\pi p2}$	15.5	98.8	-14.9	7.02	-4.74	-11	-12.1	-6.27	-8.65	100	-9.43	-8.67	-9.98	-7.59	11.8
Y_{Kp1}	-97.3	-9.87	78.9	91.6	0.879	99.9	99.5	99.5	99.9	-9.43	100	99.9	93.8	81.1	-2.27
$Y_{\gamma p1}$	-96.7	-9.13	78.6	91.7	-0.432	99.8	99.2	99.7	99.9	-8.67	99.9	100	93.8	81.2	-2.17
$Y_{\gamma\gamma 1}$	-92.1	-10.4	74.9	85.7	-10.1	93.7	93.7	93.1	93.7	-9.98	93.8	93.8	100	75.8	-2.4
$Y_{\Sigma p1}$	-77.3	-7.98	59.5	76	-0.275	81	80	81.3	81.2	-7.59	81.1	81.2	75.8	100	55.7
$Y_{\Sigma p2}$	3.52	12	-8.18	2.32	-1.75	-2.66	-2.85	-1.7	-2.16	11.8	-2.27	-2.17	-2.4	55.7	100

Appendix $RR_c L^{qc}(15)$ ($N=7$) Parameters evolution

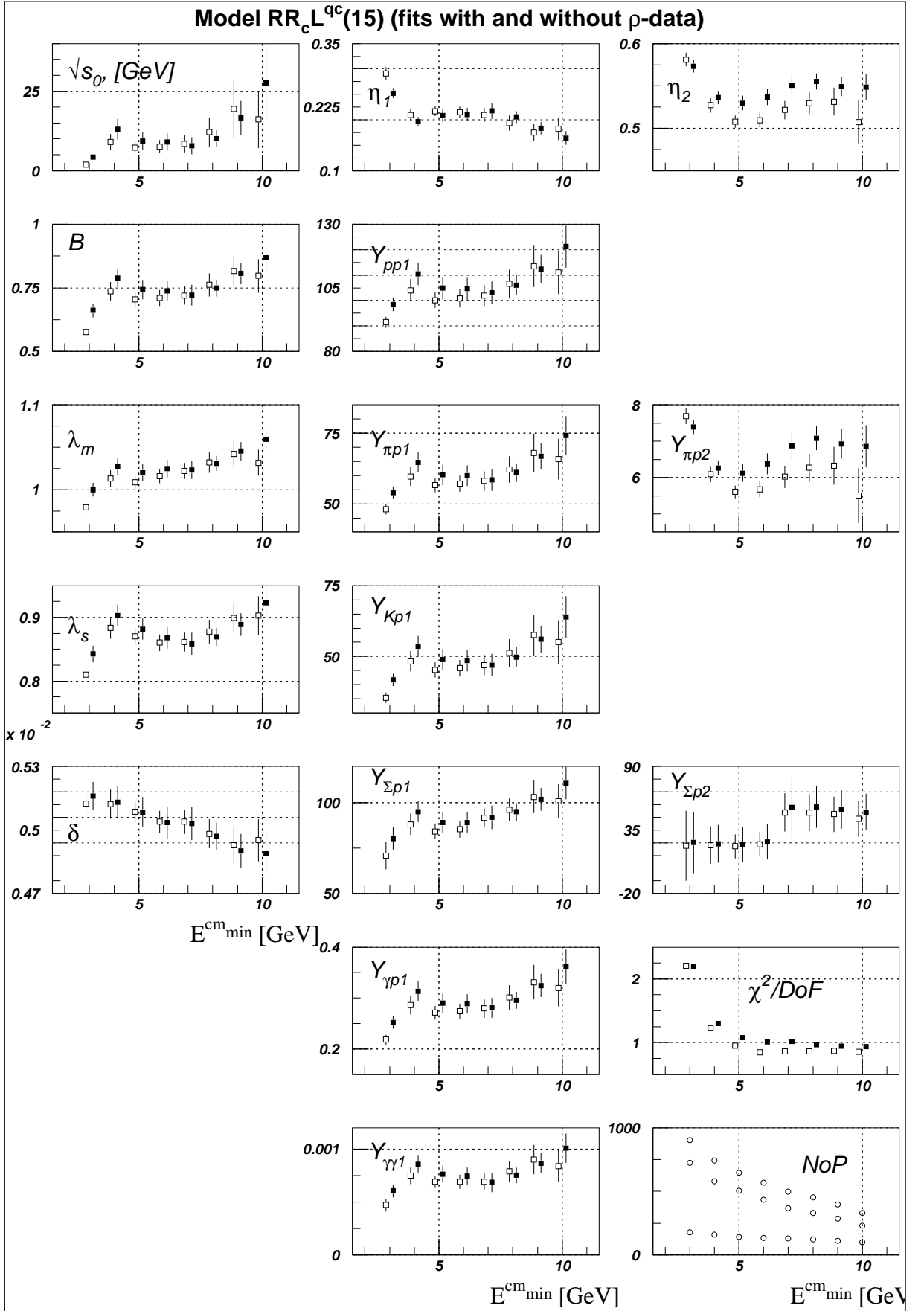


Figure 21: Bold (empty) symbol marks fits with (without) ρ data and are shifted to the right (left) in energy slightly for the cleanness

