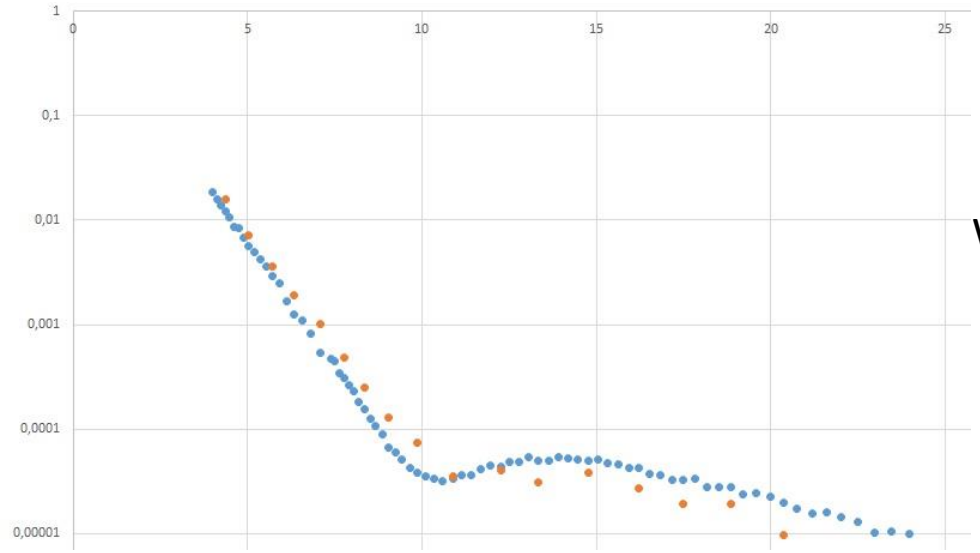
Cross-checking the Odderon-effect



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5th Day of Femtoscopy

Gyöngyös

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EFOP-3.6.1-16-2016-00001

Outline

- Odderon-effect: $H(x)$ function
- Dataset: TOTEM – 2.76 TeV, 7 TeV

  D0 – 1.96 TeV
- Quantification: how to compare two different scaling function
- Extrapolation: how to extrapolate data point where measurements are missing
- Results

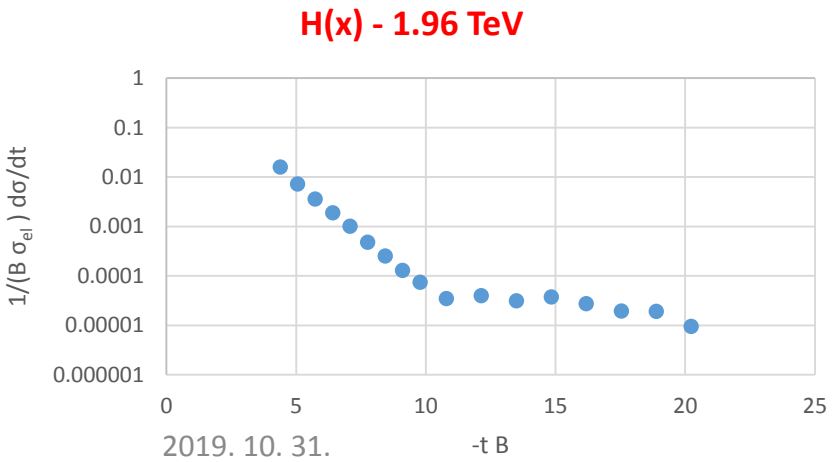
Odderon-effect: *H*(*x*) scaling function

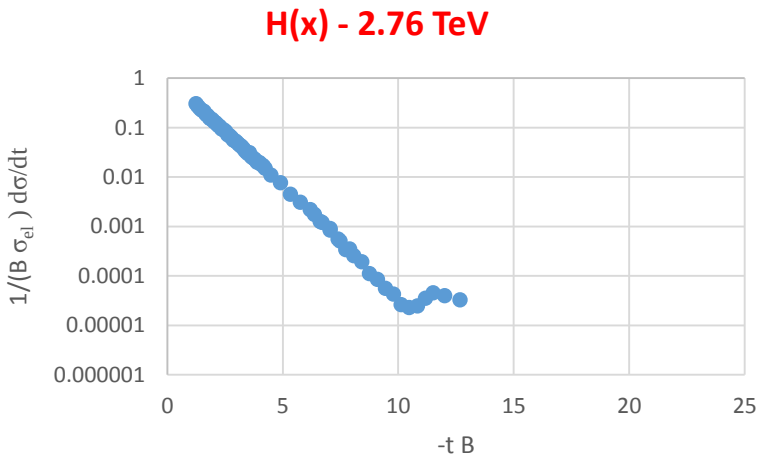
- We investigate the scaling properties of

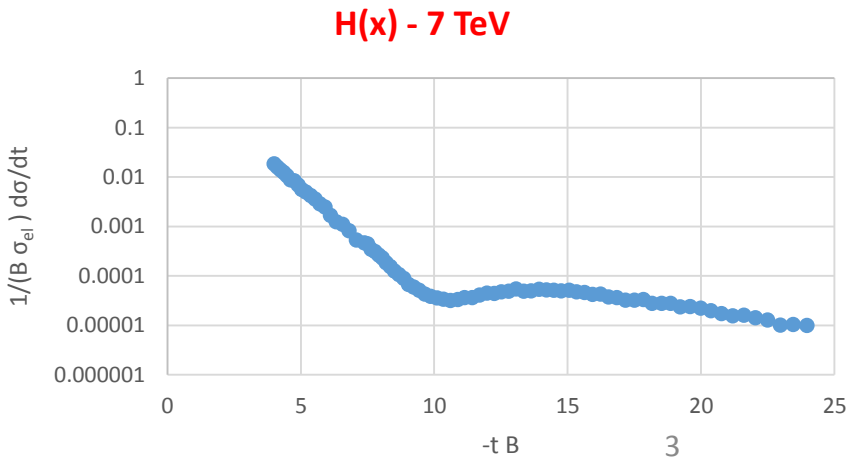
$$H(x) = \frac{1}{B(s)\sigma_{el}(s)}\frac{d\sigma}{dt}, \text{ where}$$

$$x = -tB(s)$$

at different energies.







Quantification / Extrapolation

- How to compare two different measured $H(x)$ scaling functions
- Determine if two different measurement correspond to significantly different $H(x)$ scaling functions, or not.
- Compare the data-sets D_1 and D_2 by creating a common domain X_{12} and linear extrapolation between neighbouring data points.
- Using

$$\chi^2 = \sum \frac{(d_{12}(j) - d_{21}(j))^2}{e_{12}^2(j) + e_{21}^2(j)}.$$

Cross-checking step by step

	A	B	C	D	E	F	G	H
1		value	error	2,76 TeV - original				
2	slope_totem	17,1	0,3	-t	ds/dt	stat	syst	tot
3	sigma_totem	21,8	1,4	0,07246	113,88	2,96	1,455	3,29828
4				0,07746	101,14	2,181	1,319	2,54883
5	slope_D0	16,86	0,2	0,08246	88,78	1,752	1,181	2,11288
6	sigma_D0	17,6	1,1	0,08746	83,25	1,6	1,13	1,9588
7				0,09246	79,25	1,542	1,097	1,8924
8	**Errors**			0,09746	69,81	1,326	0,986	1,65241
9	BS_err_totem	372,78	24,81724	0,10246	64,27	1,26	0,926	1,56367
10	BS_err_D0	296,736	18,87709	0,10746	56,75	1,133	0,833	1,40626
11				0,11246	54,96	1,085	0,822	1,36122
12				0,11746	49,43	1,002	0,754	1,254
13				0,12246	46,41	1,135	0,721	1,34464
14				0,12746	41,59	0,904	0,658	1,11811
15				0,13246	39,28	0,853	0,633	1,06221

	I	J	K	L
1		2,76		

	X	Y	Z	AA	AB	AC	AD	AE	AF	AG
	Összevont					Összevont error				
	-t B	H1(x)	H2(x)			-t B	e1(x)	e2(x)		
	4,23157	0,0149686		4,23157		4,23157	0,00128		4,23157	
	4,3836	0,0124403	0,015940095	4,3836		4,3836	0,000991770	0,001340	4,3836	
	4,47353	0,0109448	0,01477618	4,47353		4,47353	0,00082	0,00123	4,47353	
	4,90103	0,0076989	0,00924334	4,90103		4,90103	0,00060	0,00071	4,90103	
	5,058	0,0065071	0,007211798	5,058		5,058	0,000512589	0,00052	5,058	
	5,32853	0,004453	0,005751797	5,32853		5,32853	0,00036	0,00041	5,32853	
	5,7324	0,0031606	0,003572199	5,7324		5,7324	0,000274596	0,00026	5,7324	
	5,75603	0,0030849	0,003513629	5,75603		5,75603	0,00027	0,00026	5,75603	
	6,18353	0,0021997	0,002454058	6,18353		6,18353	0,00020	0,00018	6,18353	
	6,35949	0,0017611	0,002017939	6,35949		6,35949	0,00016478	0,00015	6,35949	
	6,4068	0,0017093	0,001900679	6,4068		6,4068	0,000165447	0,00014	6,4068	
	6,61103	0,0012608	0,001629213	6,61103		6,61103	0,00013	0,00012	6,61103	
	6,70115	0,0012168	0,001509429	6,70115		6,70115	0,00011	0,00011	6,70115	
	7,03853	0,0009121	0,001060976	7,03853		7,03853	0,00014	0,00008	7,03853	

	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR
	Vízszintes hibák										
	-t B	e1t	e2t			f_1'	f_2'	khi2		khi2	379,9568704
	4,35591	0,06570		4,35591						ndf	82
	4,3836	0,066117647	0,05200	4,3836	-0,015	-0,0144719968	-0,01874614	4,0008016756			
	4,47525	0,06750	0,05309	4,47525		-0,0153800628	-0,01683069	3,6012767809			
	4,61448	0,06960	0,05474	4,61448		-0,0021697017	-0,01428864	5,9410775705			
	4,75371	0,07170	0,05639	4,75371		-0,0122512186	-0,01213052	1,6038598777			
	4,89294	0,07380	0,05804	4,89294		-0,0102323170	-0,01029837	2,2130120456			

,00008
132544
,00005
,00008
,00003
04E-05
,00006

Results

- Different data-set → use the published
- Different parameters → use the published
- Same chi2 → two independent code gave same numbers

Thank you for your attention!