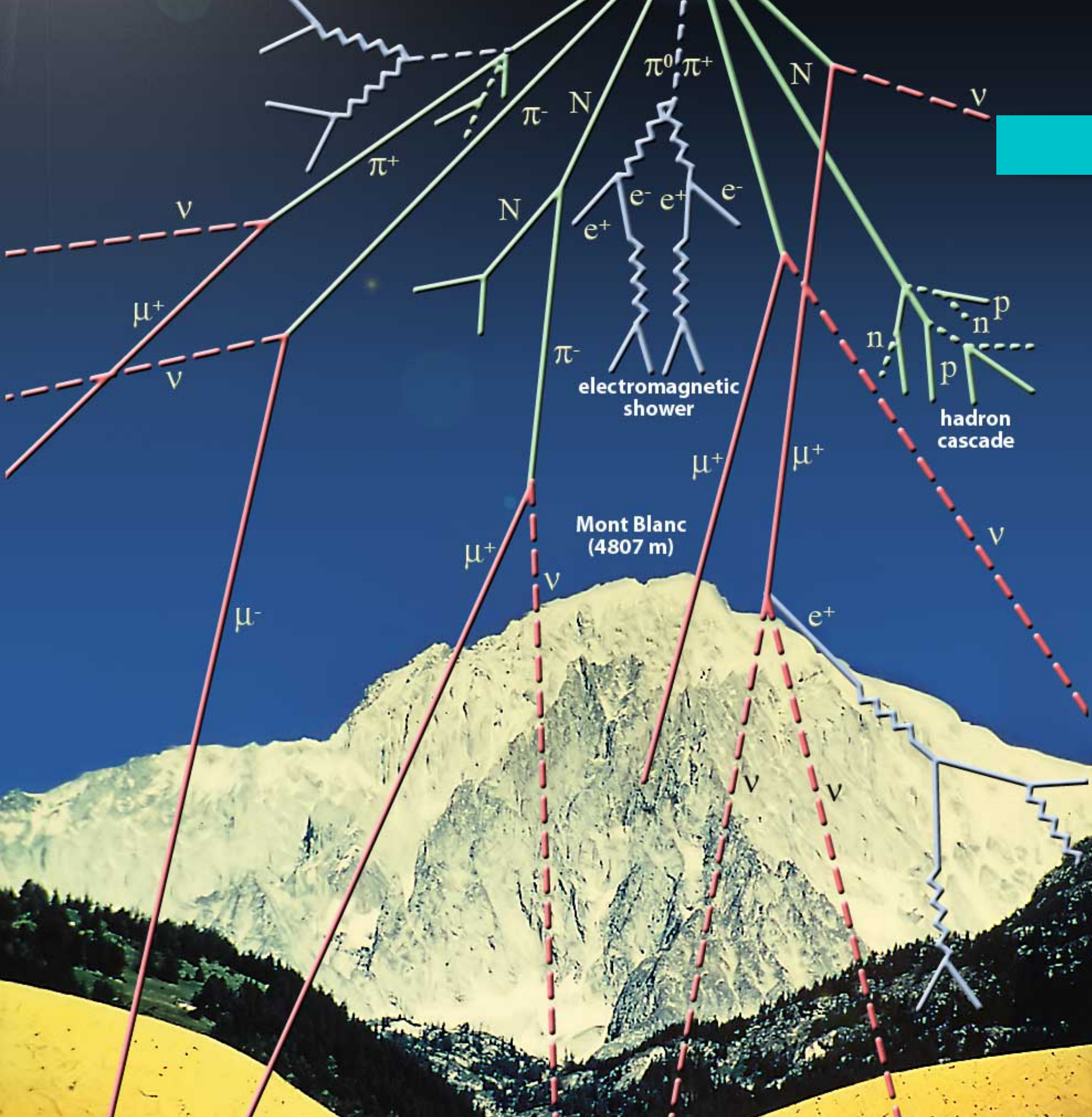




EEE MASTERCLASS

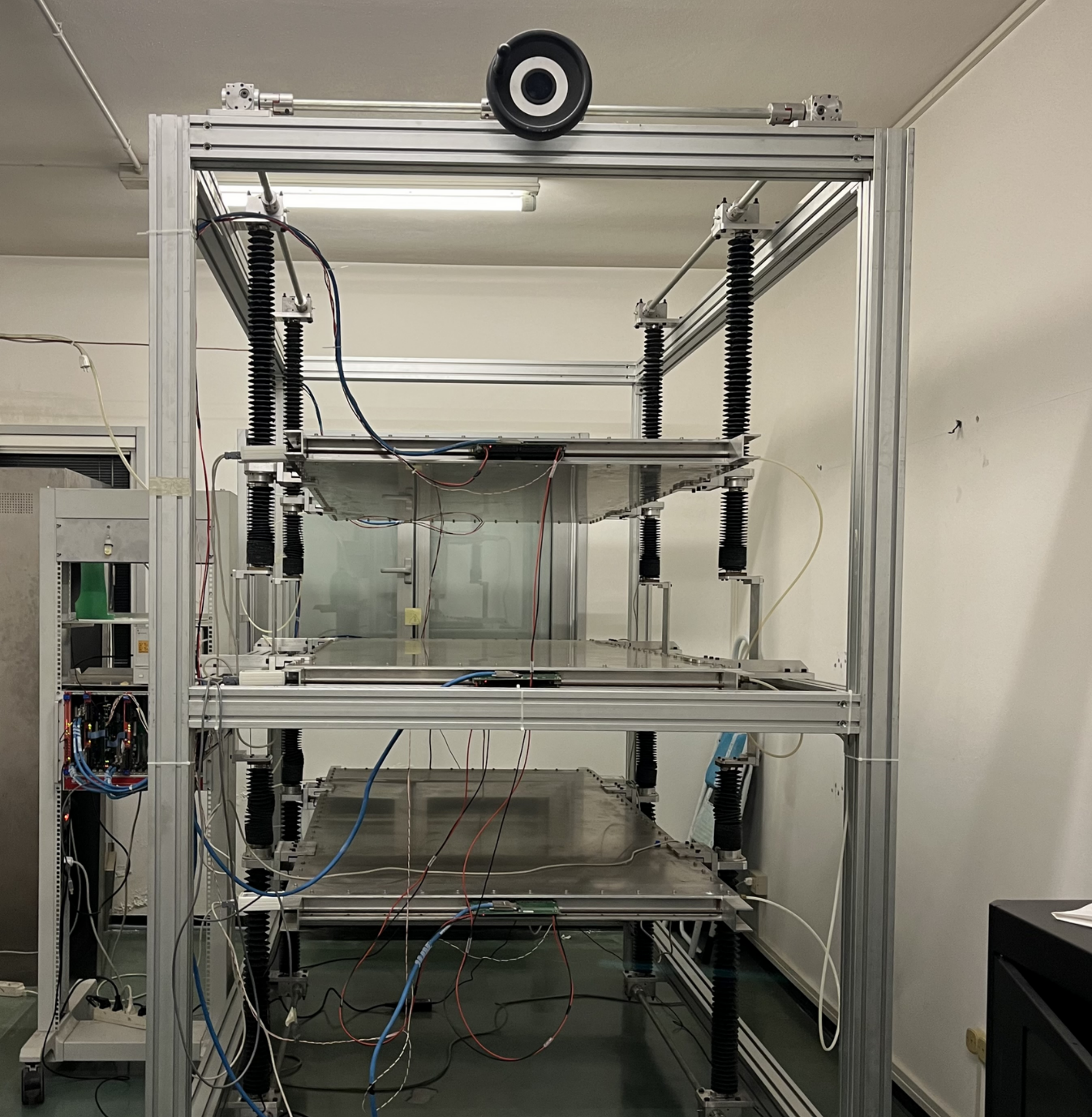
Gruppo 8





Raggi cosmici

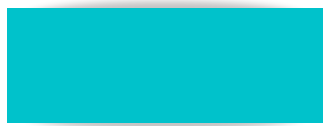
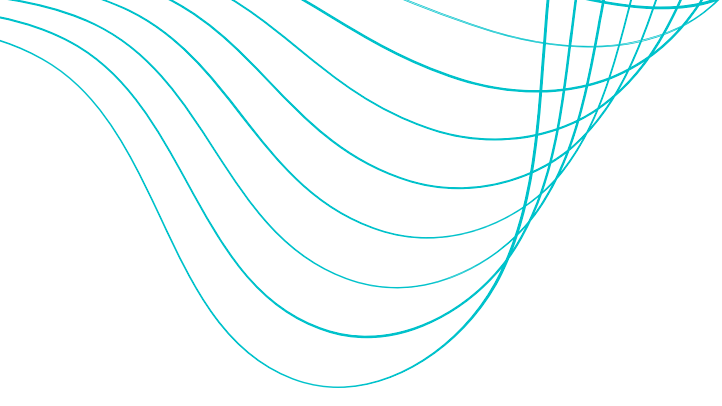
I raggi cosmici (primari) colpiscono nuclei atomici nell'alta atmosfera e producono sciame di particelle. La maggior parte di queste decadono ben prima di arrivare a terra, dove arrivano invece i muoni.



Provenienza dei dati

LNLE-01

A turni da sei persone ognuno, abbiamo registrato gli eventi associati al passaggio di muoni attraverso le tre lastre del “telescopio muonico”. Abbiamo impostato un voltaggio di 18250 V e abbiamo lasciato funzionare la macchina per tre minuti.



Formule utilizzate

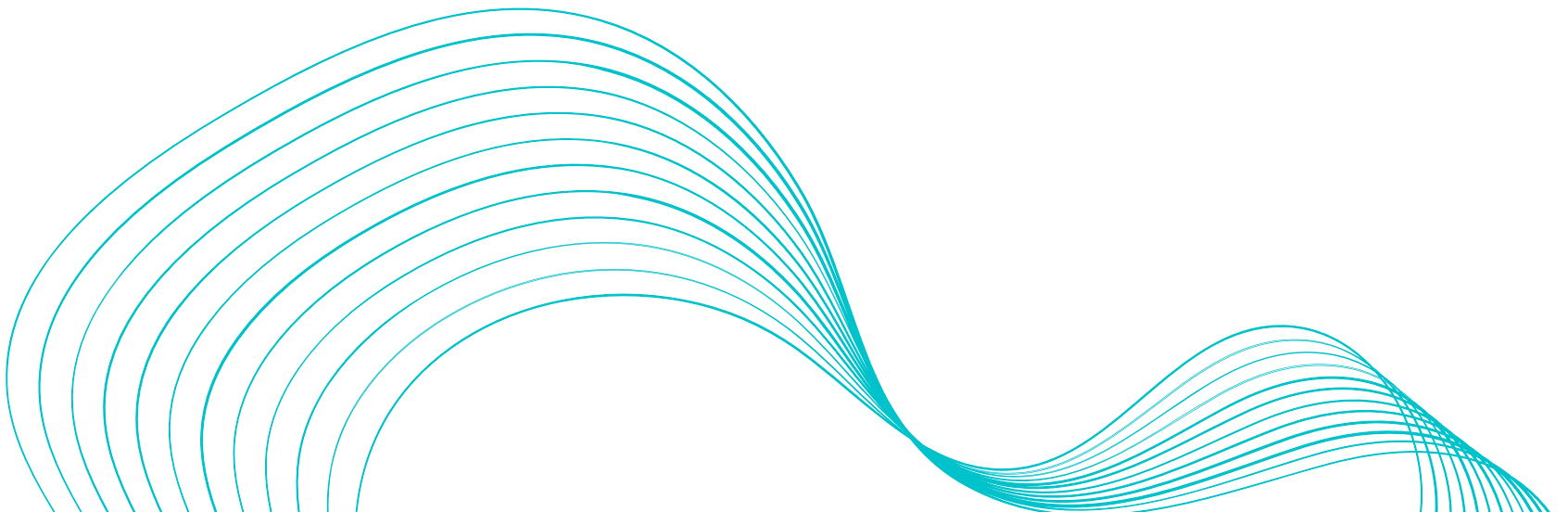


$$L = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$$

$$V = L/T$$

$$Eff = \frac{NUM}{DEN} = \frac{\text{Particles detected}}{\text{Detectable particles passing through the detector}}$$

$$\frac{1}{\beta} = \frac{c}{V} = \frac{c \times T}{L}$$



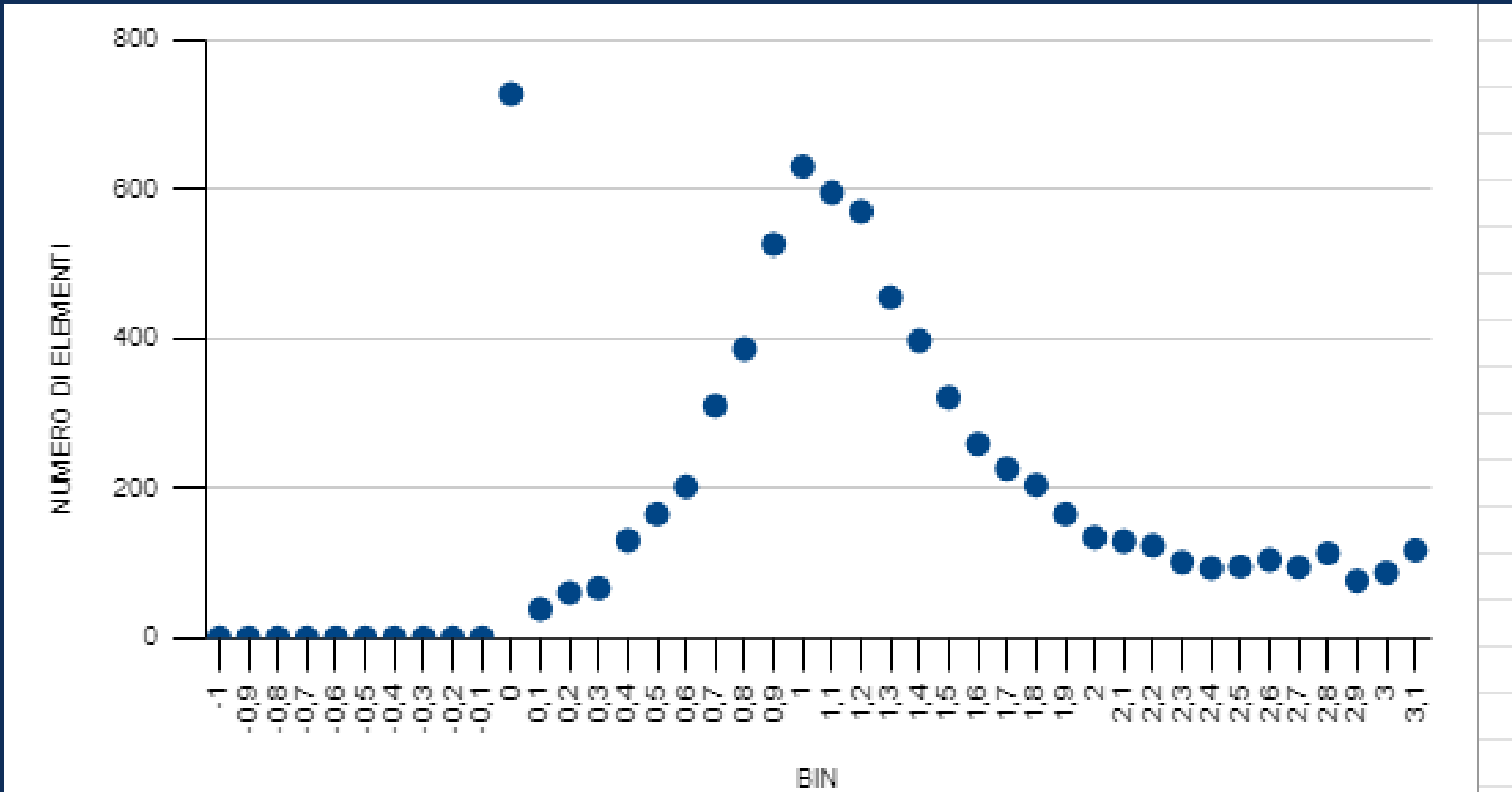
Dati originali forniti dal telescopio

	A	B	C	D	E	F	G	H	I	
1	x _B	y _B	t _B	x _M	y _M	t _M	x _T	y _T	t _T	
2	110,44	75,2	426,24	118,74	69,6	423,17	127,03	64	421,14	
3	50,4	46,4	416,19	31,84	44,8	405,14	13,27	43,2	404,24	
4	52,77	64	423,14	38,55	52,8	420,69	24,33	41,6	421,04	
5	63,44	68,8	409,26	46,85	62,4	406,57	30,26	56	405,82	
6	45,66	60,8	427,49	65,41	37,6	419,07	85,16	14,4	417,49	
7	59,88	4,8	413,94	44,08	4	411,82	28,28	3,2	409,99	
8	107,28	3,2	418,99	111,23	19,2	414,52	115,18	35,2	414,99	
9	127,03	6,4	433,94	128,61	28	428,24	130,19	49,6	426,74	
10	55,93	3,2	425,84	80,82	15,2	422,19	105,7	27,2	420,99	
11	130,19	11,2	428,94	120,71	44	425,07	111,23	76,8	423,94	
12	53,56	54,4	418,09	37,96	47,2	410,36	22,36	40	409,57	
13	125,45	3,2	433,64	129,6	10,4	432,11	133,75	17,6	430,86	
14	90,69	73,6	433,84				91,48	76,8	428,09	
15	101,36	30,4	410,71	78,25	37,6	404,11	55,14	44,8	405,29	
16	88,32	72	420,69	79,63	66,4	413,09	70,94	60,8	413,69	
17	68,57	3,2	423,94	46,85	8	421,44	25,12	12,8	422,59	
18	83,19	14,4	414,16	85,56	38,4	410,19	87,93	62,4	410,61	
19	45,66	75,2	410,04	59,09	56,8	406,46	72,52	38,4	405,89	
20	32,63	4,8	414,11	47,83	8,8	410,19	63,04	12,8	408,99	
21	70,15	8	412,04	71,34	14,4	409,94	72,52	20,8	409,24	
22	107,28	64	411,89	114,98	69,6	406,49	122,69	75,2	405,21	
23	53,17	72	360,82				53,56	35,2	432,60	

Dati elaborati

K	L	M	N	O	P	Q	R	S	
delta t	delta s		v	1/beta	bin			taglio	b
5,1	121,6579964		23,85450911	1,256753835	-1,1	2			1
11,95	125,6537978		10,51496216	2,851103537	-1	2	0		0 v
2,1	125,3419068		59,68662229	0,5022774728	-0,9	2	0		0
3,44	125,1589086		36,38340366	0,8239813427	-0,8	2	0		1
10	134,5853261		13,45853261	2,227527077	-0,7	2	0		0
3,95	124,101249		31,41803772	0,9542049083	-0,6	2	0		1
4	124,4444053		31,11110131	0,9636189184	-0,5	2	0		1 e
7,2	127,5783116		17,71920995	1,691906461	-0,4	2	0		0 0
4,85	132,110003		27,23917588	1,100592982	-0,3	2	0		1
5	138,0682498		27,61364996	1,085667626	-0,2	2	0		1
8,52	124,8230748		14,65059563	2,046281704	-0,1	2	0		0 k
2,78	121,1455736		43,57754446	0,6879517002	0	2	0		0 1
5,75	120,0452585		20,87743627	1,435963948	0,1	767	765		0
5,42	129,3972504		23,87403143	1,25572616	0,2	827	60		1 s
7	121,7682405		17,39546293	1,723394538	0,3	893	66		0 0
1,35	127,9846182		94,8034209	0,3162253589	0,4	1023	130		0
3,55	129,3308455		36,43122409	0,8228997667	0,5	1188	165		1
4,15	128,3577018		30,92956669	0,9692746782	0,6	1390	202		1
5,12	124,0514736		24,22880344	1,237339099	0,7	1700	310		1
2,8	120,7040053		43,10857333	0,6954358144	0,8	2086	386		0
6,68	121,5027082		18,18902817	1,648204924	0,9	2612	526		0
71,87	125,5165013		1,716138031	17,16503733	1	3212	630		0

Istogramma di $1/\beta$



Bottom

Efficiency curve BOTTOM

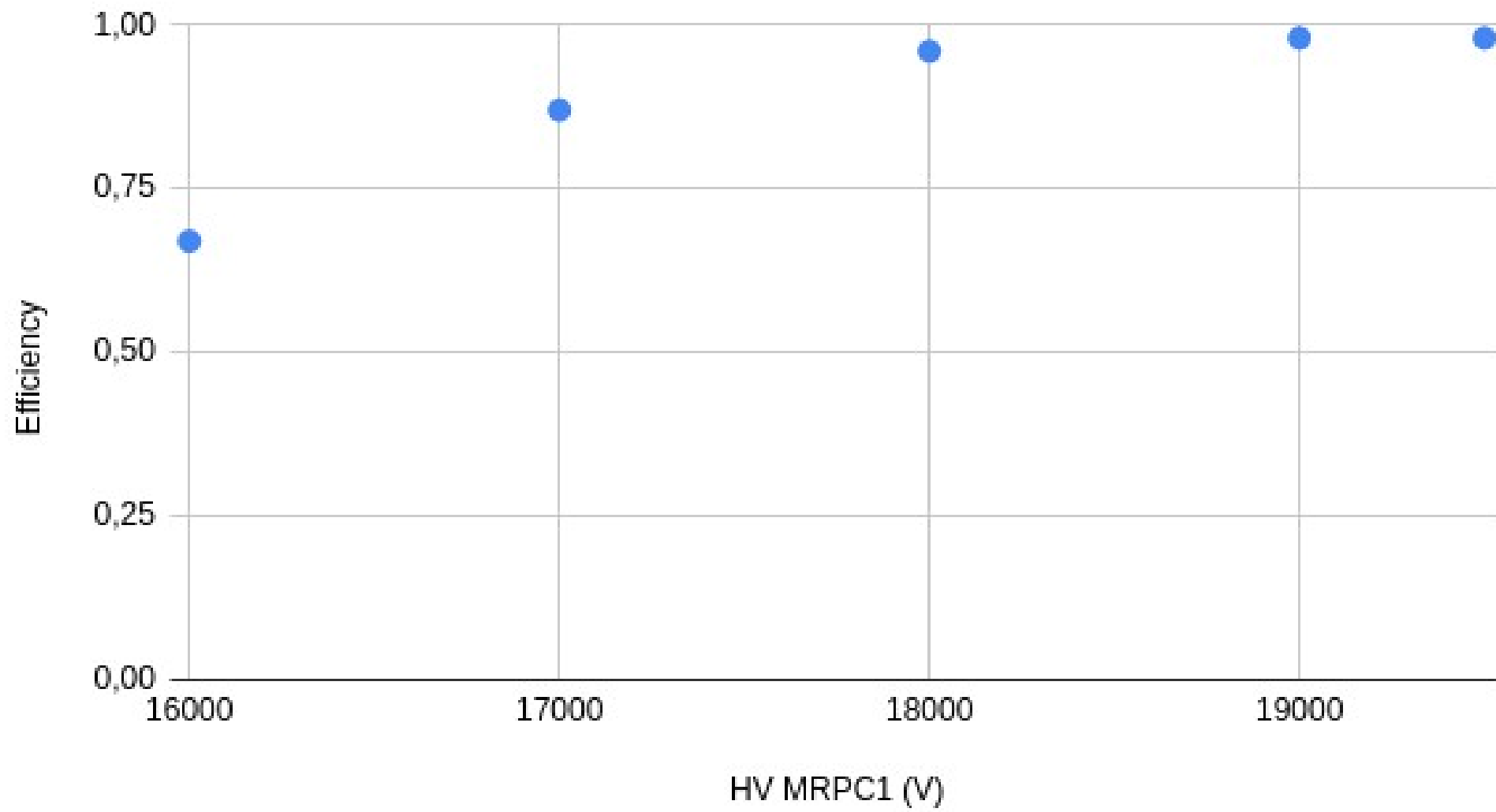
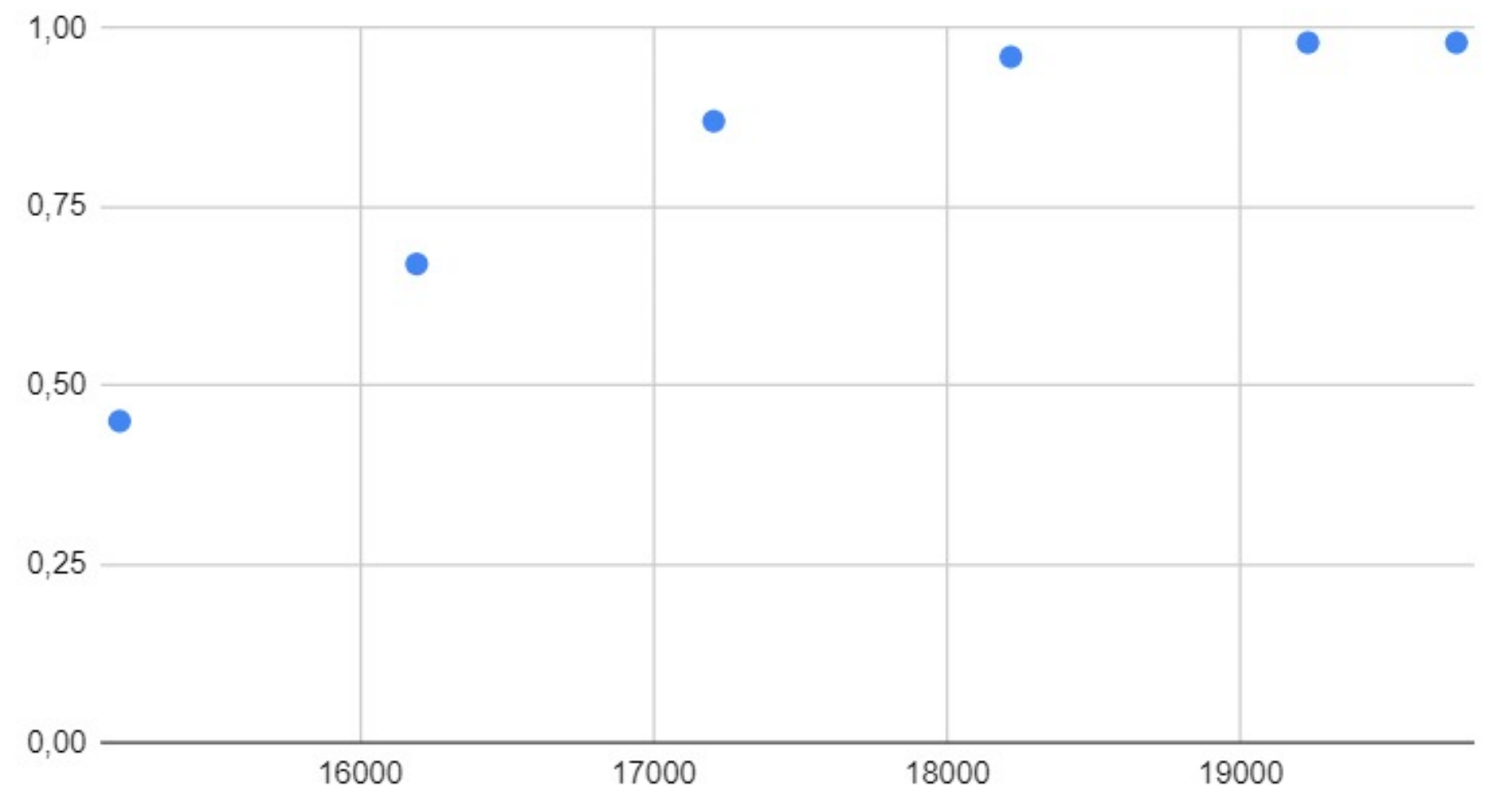
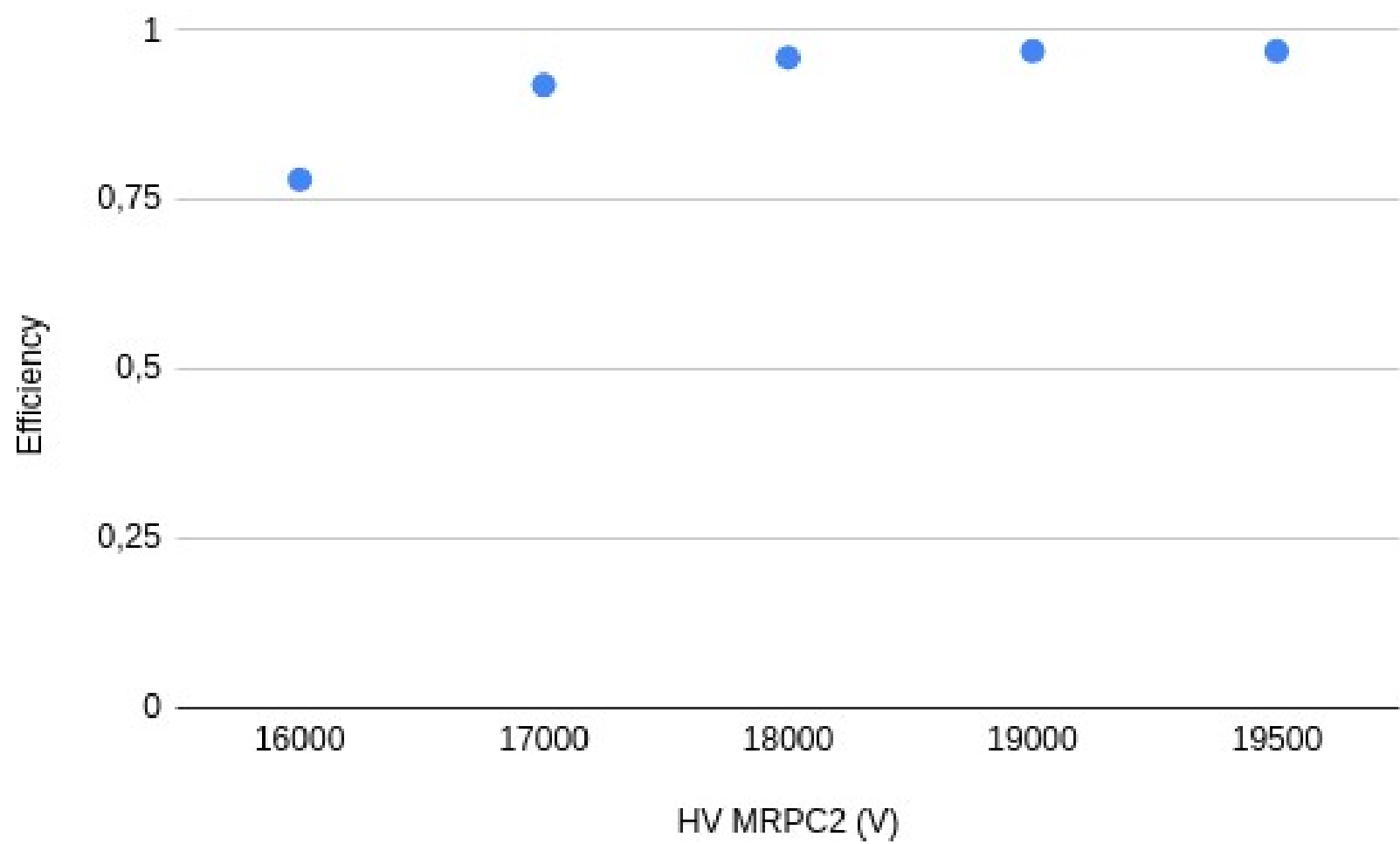


Grafico BOTTOM con la V corretta

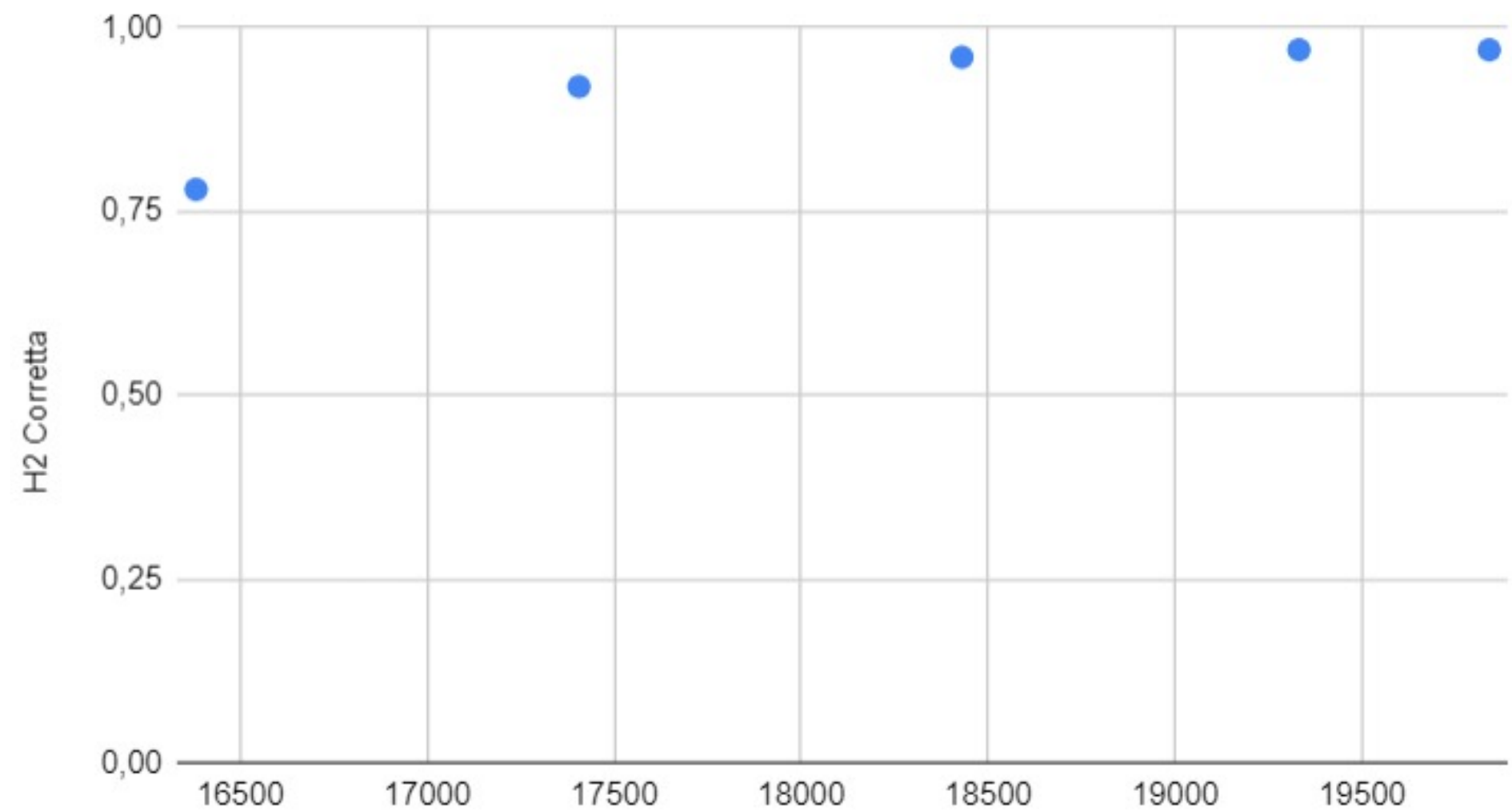


Middle

Efficiency curve MIDDLE

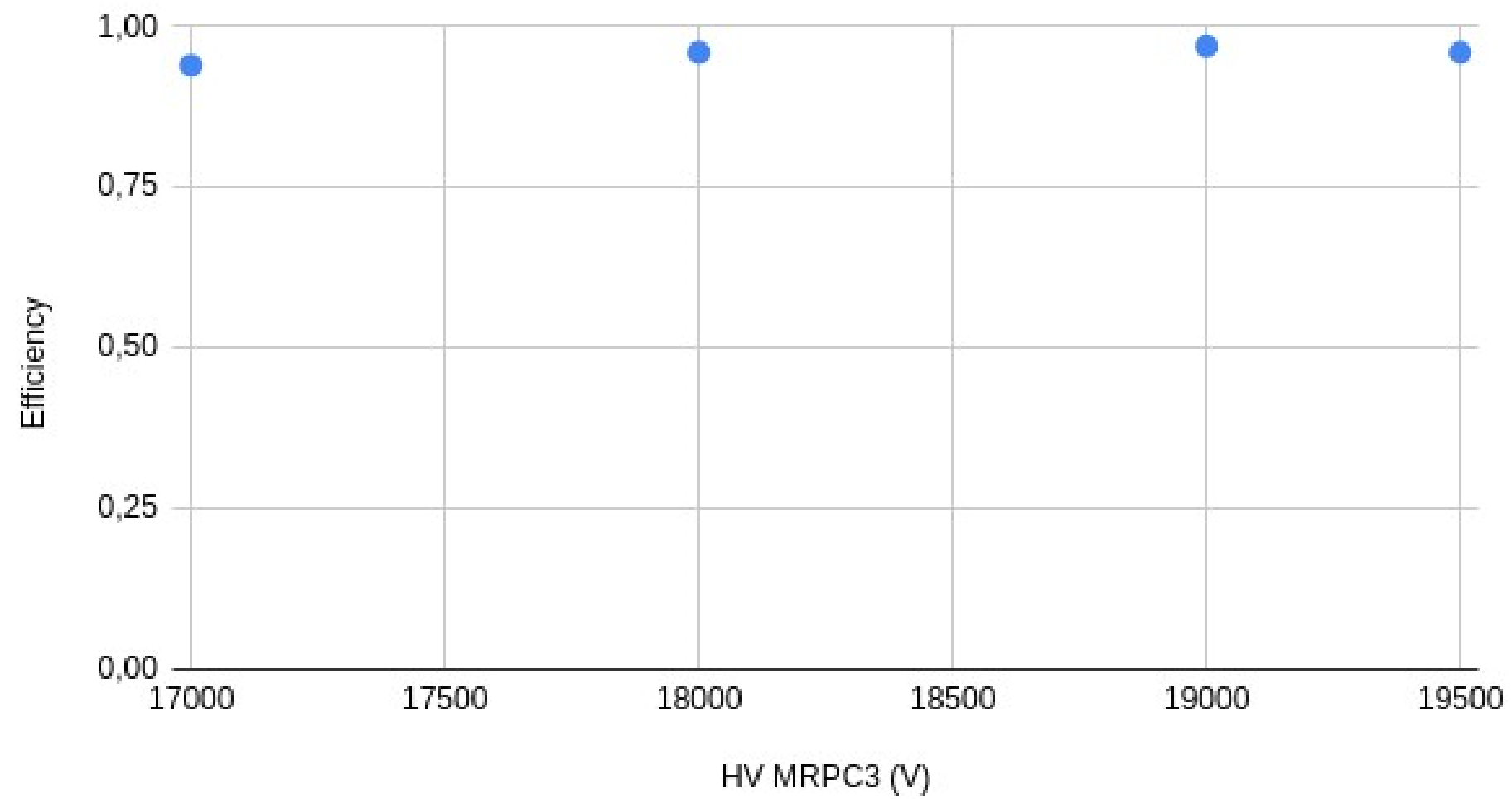


Efficiency MIDDLE con la V corretta



Top

Efficiency curve TOP



Efficency TOP corretta

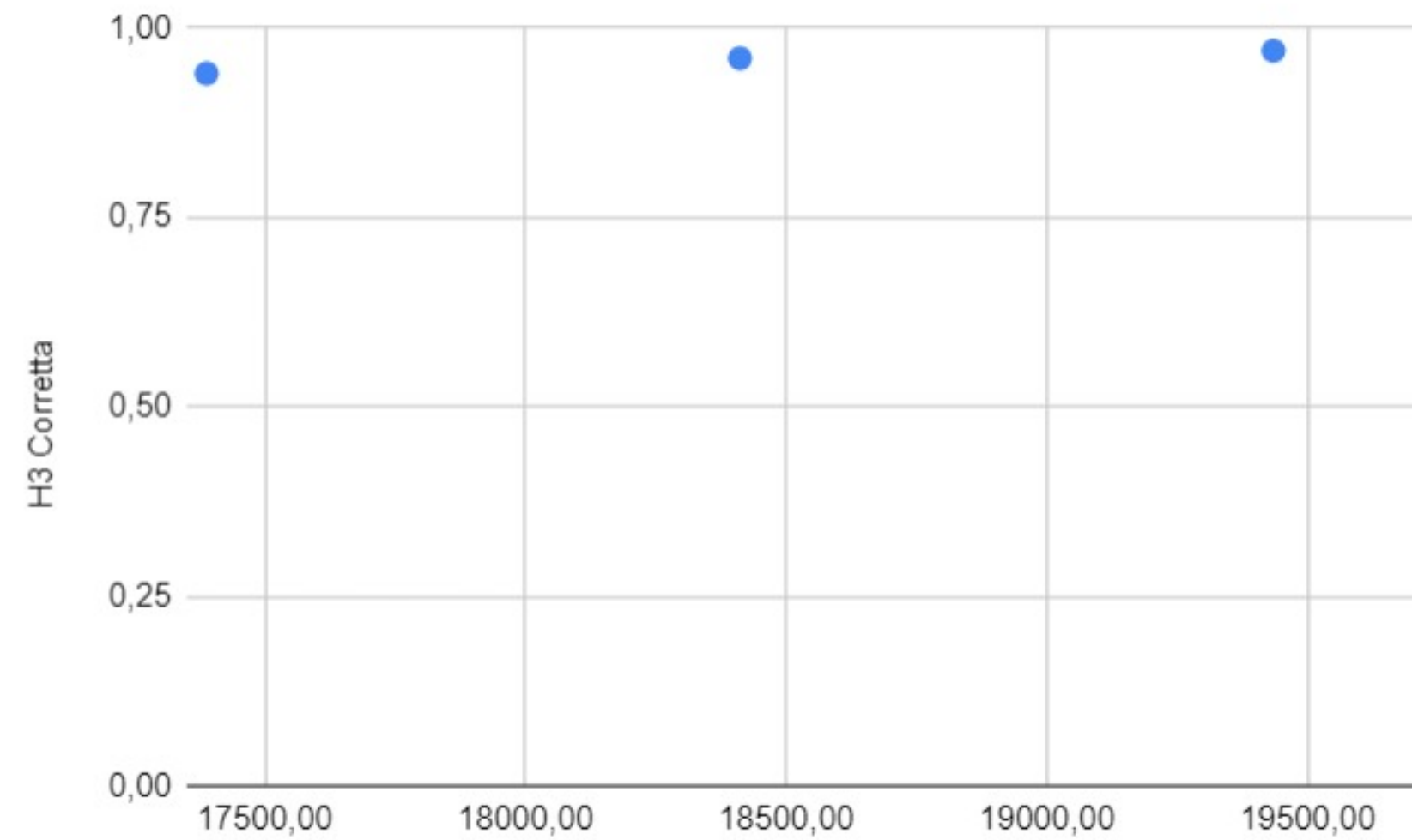
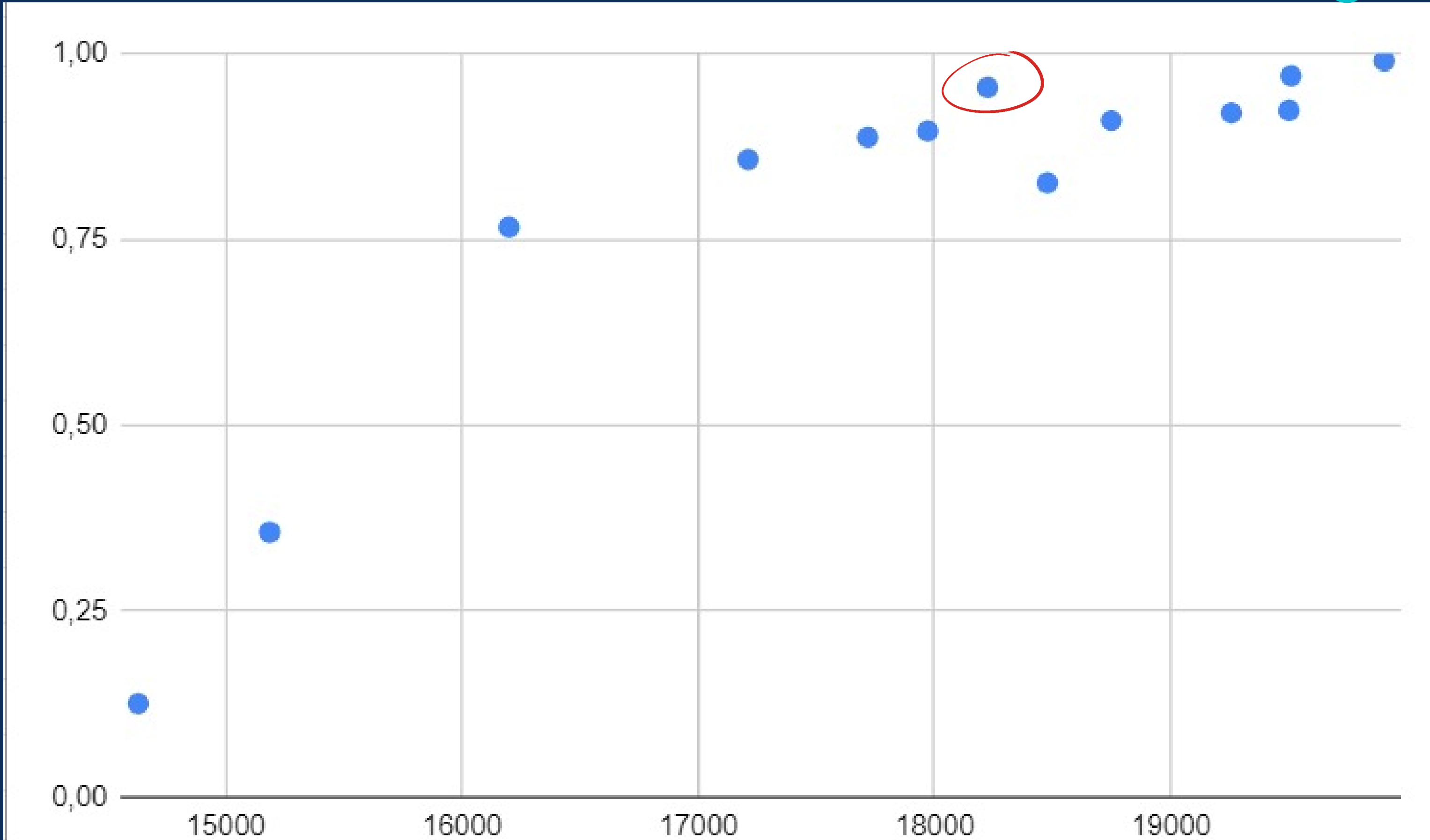


Grafico dell'efficienza con valori misurati dai gruppi





Grazie dell'attenzione