18 January 2001
F: 2333

Internal Report No. 28

Update on Status of Steering Coils

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This is an interim report intended to update information on steering coils given in report no. 6 (Kleinman) and report no. 8 (Canter). This is proposed to be a basis for three new reports:

1. A manual detailing the physical parameters of all steering coils (replacing reports no. 6,8)
2. A manual detailing the permanent – magnet models of all steering coils for use in EL-OP and GPT (replacing report no. 17 – Efimov)
3. A report and diagram detailing all electron-optical components and recommended excitation currents (replacing report no. 25 – Efimov)

The main modification reported presently are:

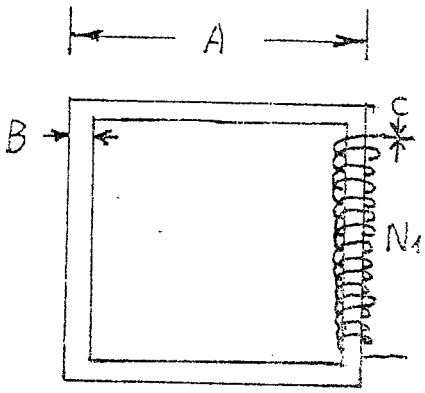
1. The old VH3 was placed after the deceleration tube and renamed VH8
2. A new coil was placed before the acceleration tube: VH3
3. The iron rods of coil VH6 were modified, remeasured and remodeled. It was repositioned at the end of the wiggler ($z = 7493$ mm).
4. An additional coil VH7A (UCLA type – identical to VH4, VH7) was positioned before the deceleration tube.
5. An additional coil VH5A was mounted on the bellows near the wiggler end. Yet disconnected from power supply.

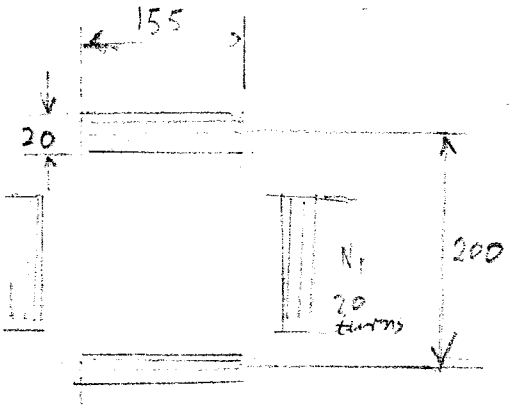
27/7/97

(8) Updated 17/1/01

iron core coils

VH1





V2

Sheet1

SUMMARY OF STEERING COILS CHARACTERISTICS

COIL	A iron ext.ext mm*mm	B iron cross mm*mm	C wire dia. mm	Imax A	windings N_1	Bmax/A gauss	ϕ/I mrad/A	ϕmax mrad	X at 1A mm
VH8.	207x207	12x12	2	10	50	1.2	15.4	154	5.1
VH4	124x124	11x11	1.35	6	180	12.24	23.2	140	3.7
VH5	207x207	12x12	0.5	1.5	520	7.3	41	62	9.5
VH6	200x200	12x12	1.2	6	160				
VH7=VH4 = VH7A		11x11	1.35	6	180	12.24	23.2	140	3.7
VH3	225x225	12x12	2	10	65	1			
VH5A	232x232	12x12	1.3	3	560-580	8	49.1		
VH1	—	—	0.67	3	20				
V2	—	—	0.67	3	20				

Modeling Steering Magnets fields in the code ELOP
VH6 Coil (fixed version)

Merhasin I., Gover A.

Internal Report

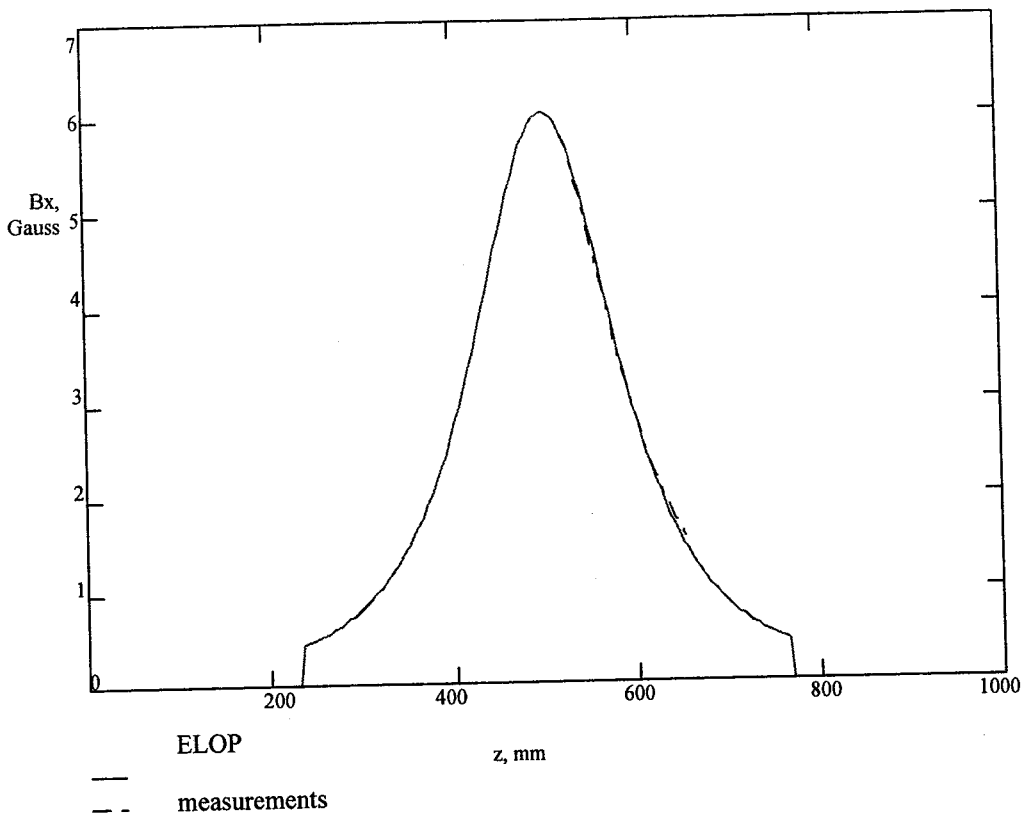
The following is a 4-blocks ELOP model of the VH6 UCLA type steering coil, used in TAU FEL (Table 1)

	a	b	c	Xm	Ym	Zm*	alpha	betha	Bs	Type	Bs/1A
1	12	159	12	85.5	0	500	0	0	2760	H6	2760
2	12	159	12	-85.5	0	500	0	0	2760	H6	2760
3	183	12	12	0	85.5	500	0	0	42.5	H6	42.5
4	183	12	12	0	-85.5	500	0	0	42.5	H6	42.5
5	183	12	12	85.5	0	500	0	90	42.5	V6	42.5
6	183	12	12	-85.5	0	500	0	90	42.5	V6	42.5
7	12	159	12	0	85.5	500	0	90	2760	V6	2760
8	12	159	12	0	-85.5	500	0	90	2760	V6	2760

Notes:

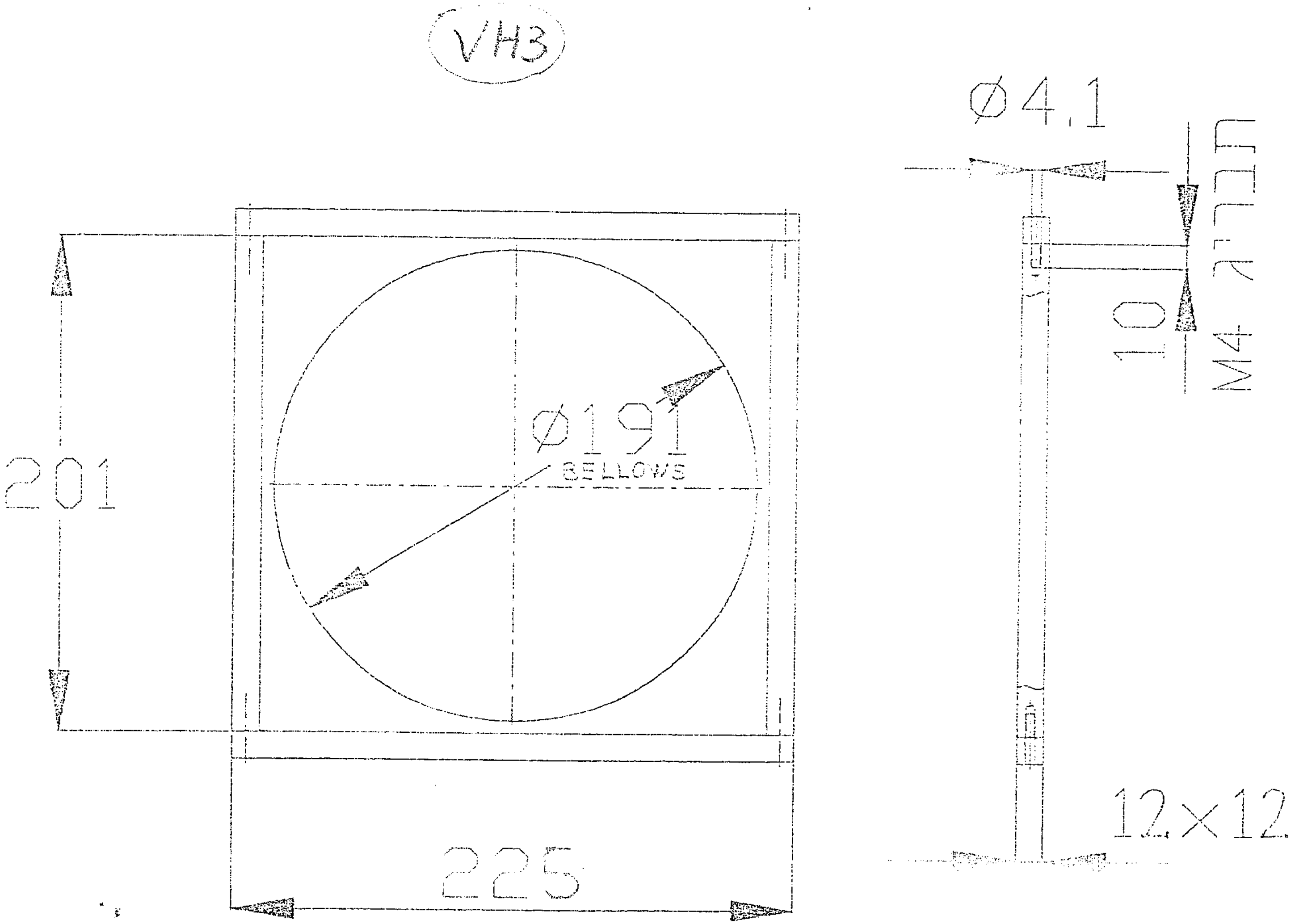
- * Zm value should be changed accordingly to a real placement of the VH6 coil
- ** Bs values given are for the coil current of 1 A.
- model accuracy is better then 1%

To compare measured and modeled field values, please refer to the graph at Fig.1 :


Bx,
Gauss
7
6
5
4
3
2
1
0
200
400
600
800
1000
z, mm
ELOP
measurements

9.6.98

סליל הליה בכניסה למגלה - מחולק סליל 50 לפופים.



4 כריכות M4×20 פלסטר

בכל צרור 65 ליפופים.

שדה במרכז: 1gauss/A

הערות	חומר	כמות
	פלדה רכה	1

אוניברסיטת תל-אביב

הפקולטה להנדסה-המחלקה להנדסת חשמל-אלקטרוניקה פיזיקלית

	שם	תאריך
שרטט	יהושע	
בקר		
אשר		
קנה מדה		

F.E.L.
STEERING COIL

אבי

6A

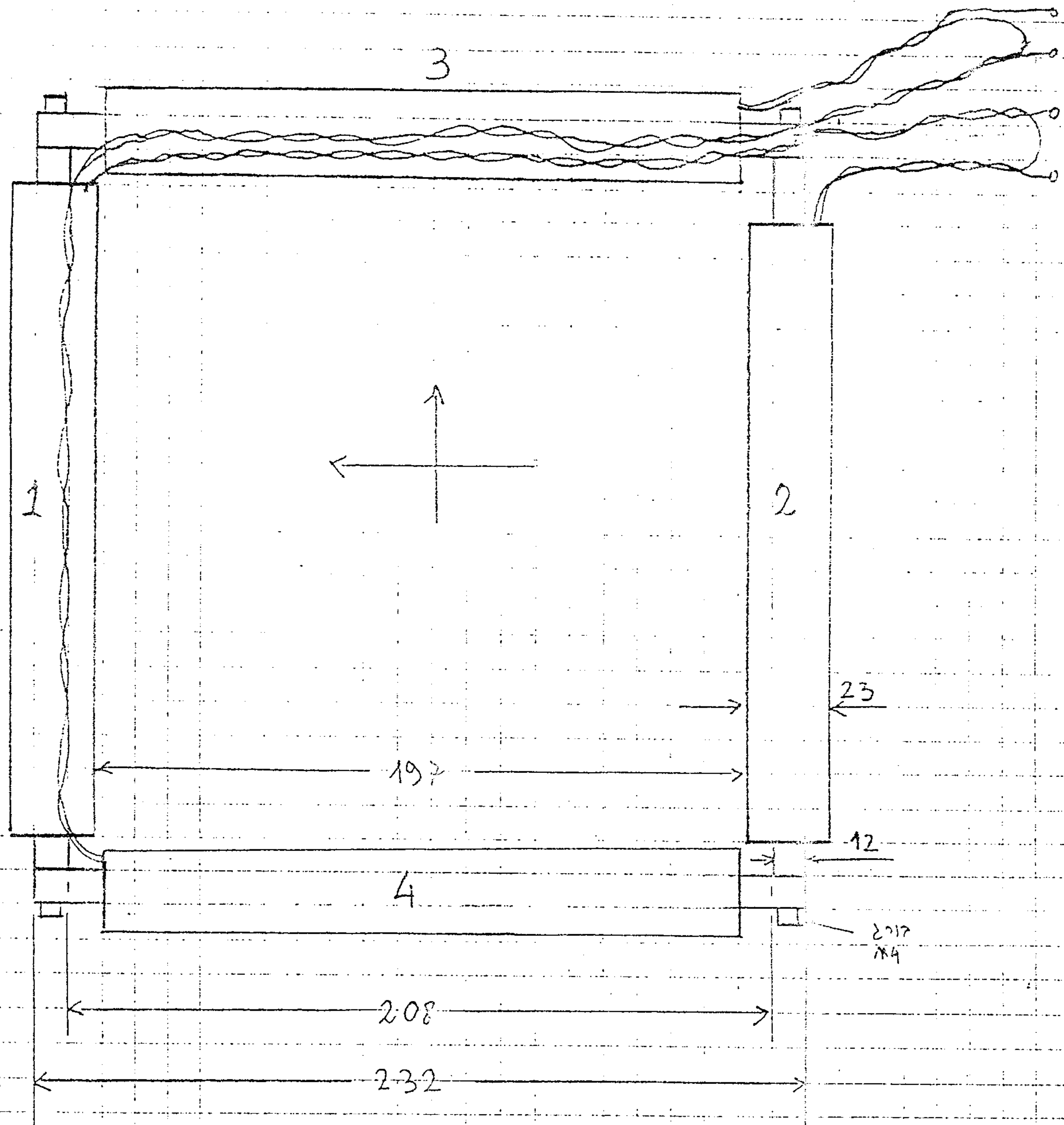
6.10.97

חיים קליינמן

VH5A

סליל הטיה בעבור Bellows בקוטר 195 מ"מ

- המסגרת [illegible].
- להרכבה יש לפרק סליל מס' 2.



תיל לפוף - קוטר 1.3 מ"מ, 4 שכבות, כ 140÷145 לפופים בשכבה. סה"כ כ- 560-580 לפופים.

התנגדות זוג סלילים 1-2 : סלילים קרים: 1.12Ω סלילים חמים (81°) 1.36Ω

התנגדות זוג סלילים 3-4 : " : 1.18Ω " (77°) 1.33Ω

טמפרטורה בזרם 5A על גבי הסלילים 81°C (טמפ' חדר 23°C).

שדה מגנטי במרכז בזרם 5A – כ- 40 גאוס.

6