

# Collimator Design Meetings

## Minutes of the meeting 43 (16/09/2004)

**Present:** Aberle, Assmann, Bertarelli, Decorvet, Kadi, Perret, Sievers, Vlachoudis,

**Minutes # 42:** no comments were given

### **SPECIFICATION FOR IT**

1. A draft of the specification will be released Monday Sept. 20<sup>th</sup>.
2. An updated list of manufacturing and assembly operations should be prepared by Sept. 20<sup>th</sup> (**action** Alessandro / Oliver / Roger)

### **PRELIMINARY PROPOSALS FOR TCDI AND METAL COLLIMATORS**

1. A proposal for the TCDI and for the (Phase 1) metal collimators design (TCT and TCL) is shown by Roger. Both collimators are based on the existing TCS design, sharing as many components as possible. In this proposal the metal jaw is made out of copper to avoid any problem of differential thermal expansion induced by Tungsten (see [T0022831PL\\_0.pdf](#))
2. The proposal is accepted for TCDI and TCLA (having Cu jaw). A couple of drawings per variant (cross section + assembly) will be included in the Invitation to Tender.

### **CHOICE OF MATERIAL FOR TCT(a) JAW**

1. Ralph stresses that for the TCT(a) a W jaw is to be preferred to Cu in particular because it has a better behavior in case of accident (Cu tends to explode).
2. Roger proposed to modify the Cu jaw of TCLA, creating on the collimating face a deep groove where to insert W bar (section 20x20 mm circa) screwed to the main jaw.
3. The TCTs will have to be cooled because of possible RF losses.
4. A proposition for TCT(a) will be made at next meeting (**action** Roger)

### **MATERIAL FOR PIPES AND BAR**

1. Metallurgical analysis on bent pipes after bake-out show a grain growth up to the total thickness of the pipe. This problem along with erosion-corrosion rules out the use of OFE copper for the pipes. Glidcop should represent a viable alternative since it is very stable at high temperatures (no grain growth) and much harder than copper.
2. Due to the closure of the European branch of Glidcop manufacturer, direct contact shall be quickly established with the US to make an order for square pipes (**action** Alessandro)

### **STATUS OF ENERGY DEPOSITION SIMULATIONS**

1. A short presentation is given by V. Vlachoudis, showing a fairly different energy deposition on collimators (as compared to previous preliminary simulations) because of the new optics taken into account. In particular the hottest TCS (TCSGA6L1) is now found downstream of the MQW magnet and no longer upstream. The overall deposited energy on this element is roughly 22 kW (see [tcsq\\_max.pdf](#), [tcsqa6l7b1\\_y\\_3.pdf](#), [tcsqa6l7b1\\_z\\_50.pdf](#))
2. Distribution of power on each relevant component at 4e11 p/s is given in the following list:

8.70383808	Entry Collar (RF contacts)
72.323136	Exit Collar (RF contacts)
590.750208	Front Plate
5388.872832	Outer Steel
677.662272	Clamp
982.196352	Clamp
258.3195264	Support 1
515.738304	Support 2
1767.027456	Jaw 1
3945.353472	Jaw 2
1607.874048	Copper
3346.299648	Copper

909.542592	Clamp
1882.214208	Clamp
120.2153472	Springs
224.680608	Springs
62.2855872	Cooling Pipes Jaw 1
153.9670464	Cooling Pipes Jaw 2
<b>Total:</b>	<b>22516.6731201569 W</b>

The value of power deposited onto RF contacts is rather high and should be carefully considered (**action** Sergio)! Also, the energy deposited onto springs is worth being analyzed given the long thermal path (**action** Alessandro).

#### **MOTOR AND CONTROLS FOR RF FINGER TEST**

1. A check has to be made with G. Burtin (AB/BDI) to verify the availability of extra electronic equipment to be used on the fingers test bench (**action** Fabrice see also action list below)

#### **ELECTRONIC AND MOTORIZATION ISSUES**

1. A status of the situation is made by Fabrice. The presentation will be soon made available.

#### **AOB**

1. Oliver reports that the test to check LEP motor torque should be put in place in week 39.

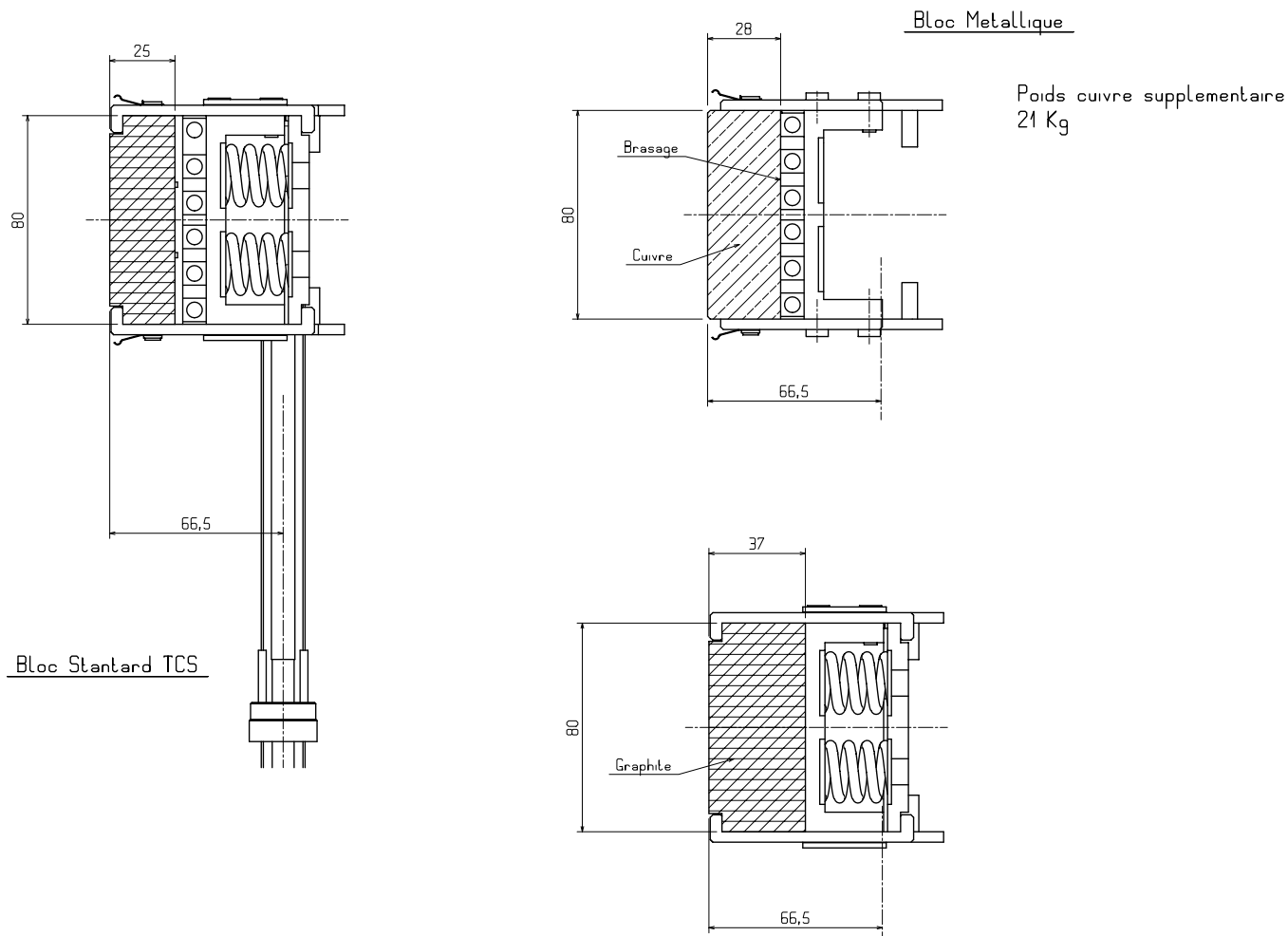
### **ACTION LIST to be followed up:**

Divisional request for motors MS	#31	Oliver, Fabrice, Stefano
Heat transfer – final report	#31	Sergio
"plug-in" position control unit	#32	Roger, Fabrice
Drilling holes after phase one – grooves in tunnel floor	#33	Oliver
Contact fingers – model for tests top and side	#34	Sergio, Roger
Play between motor spindle and jaw	#34	Roger
Non-symmetric heating of vacuum flanges	#34	Vasilis, Oliver, Miguel, Rathjen
"Remote control" collimator exchange	#35	Keith, Roger
Radiation issues – heat evacuation, air duct, space, shielding		Ralph
Electrical plug-in	#36	Oliver, Fabrice, Roger
Preparation of all raw-material list and order	#40	Oliver, Raymond
Fingers model: motors and control available <b>URGENT</b>	#41	Oliver, Fabrice

AUTEUR : PERR-EST  
 DATE CREAT : 13-SEP-2004  
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 ESPACE : 500.00000  
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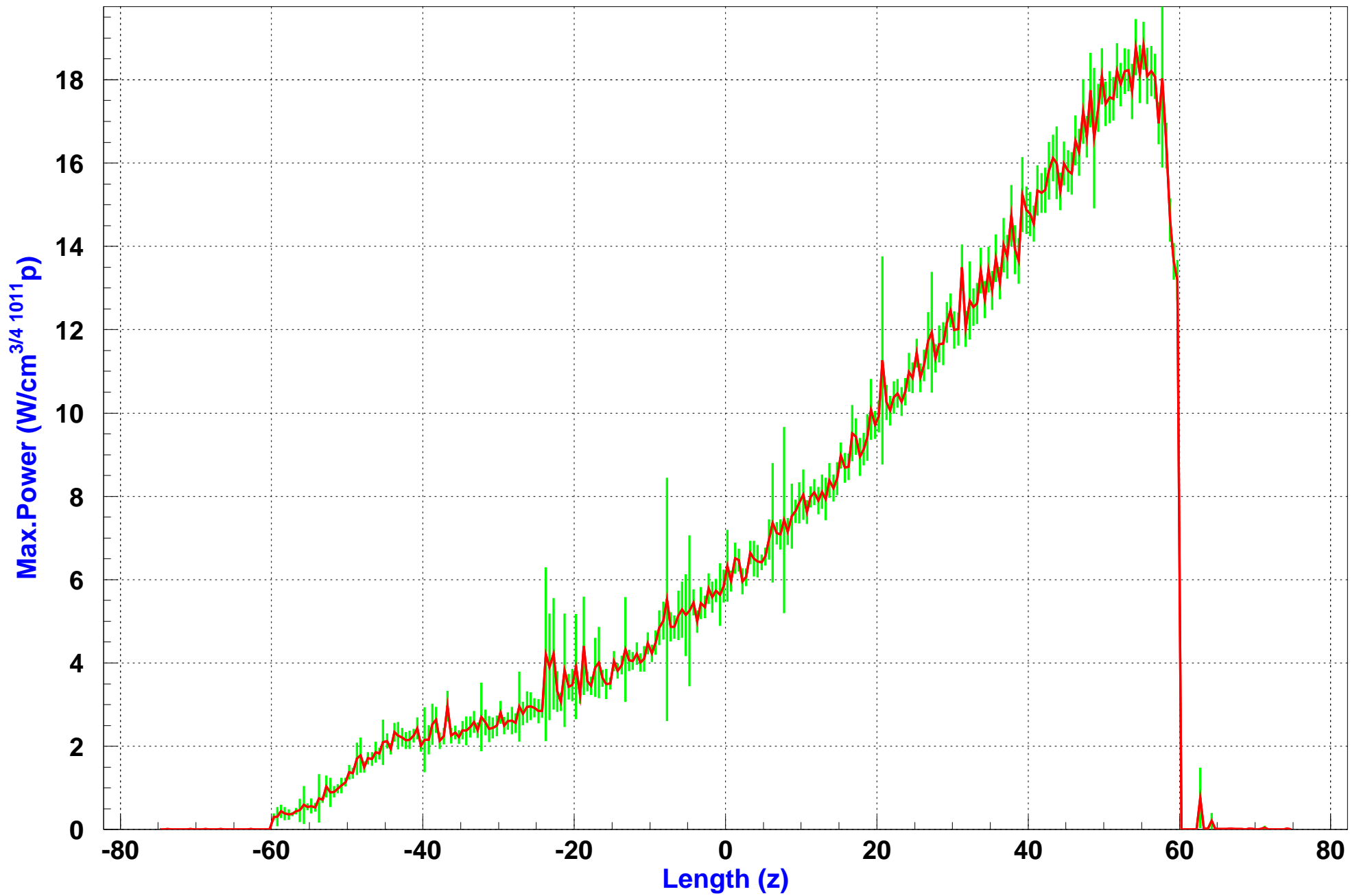
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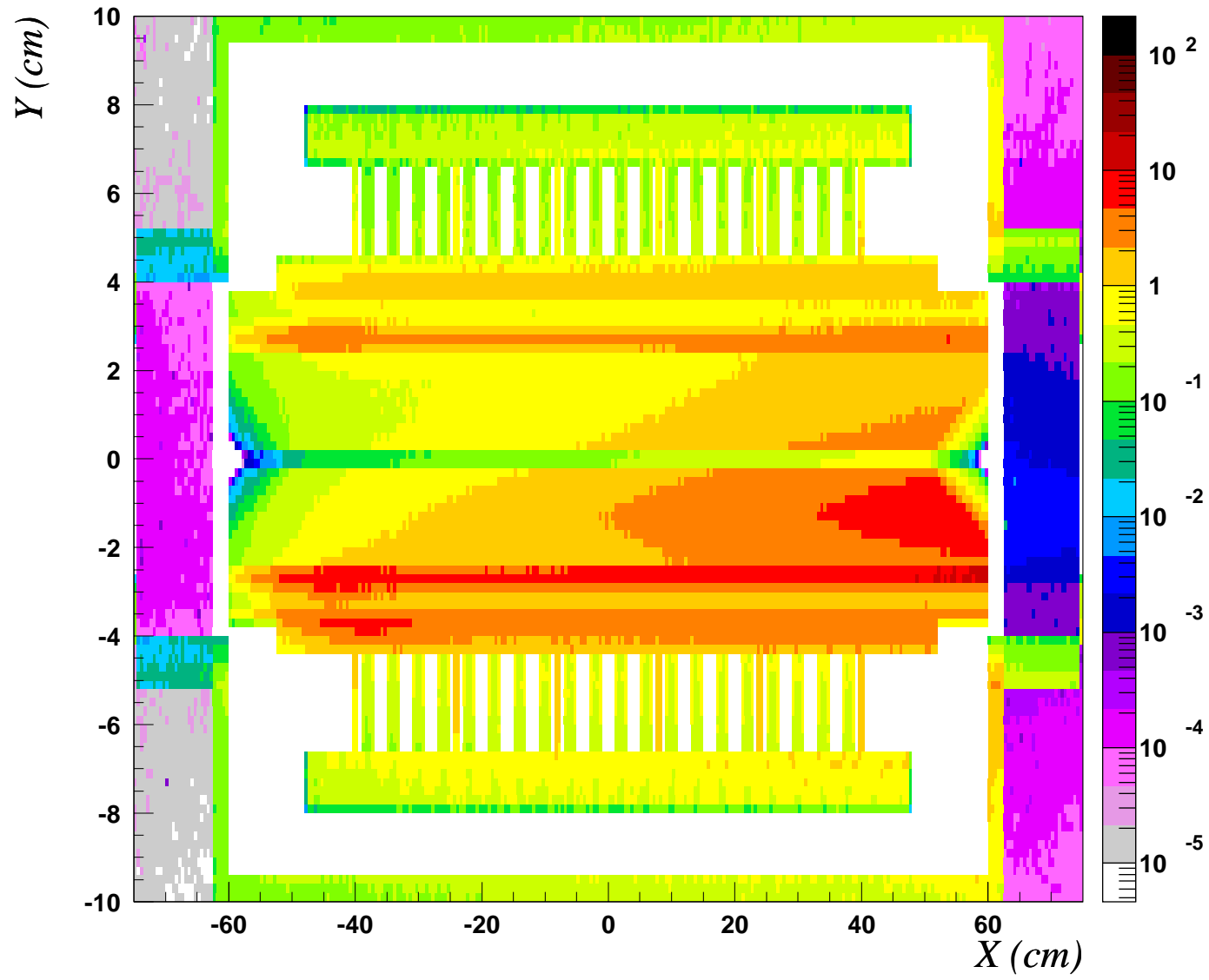


TYPE : PLAN  
 VERS EUCLID : E32.4000 MODIF:E32.4000  
 MACH/OUVR : LARGE HADRON COLLIDER  
 ACTIVITE : INSTRUMENTATION FAISCEAU  
 FONCT/UTIL : COLLIMATEUR  
 DESIGNATION : ETUDE BLOC TCS TOUT METALLIQUE  
 CODE EQU/BAT :  
 REMARQUES :  
 :  
 :  
 :

Maximum Power deposition vs length



# TCSGA6L1



# TCSGA6L1

