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791 Experimental area

G. M. Bunce

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Collider Accelerator Department

Brookhaven National Laboratory

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Alternating Gradient Synchroton Department
BROOKHAVEN NATIONAL LABORATORY
Associated Universities, Inc.
Upton, New York 11973

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This is the least-developed piece of the project. We have looked at the analyzing magnets and have a preliminary layout for the experimental area. Some changes have been requested on this layout.

I. Analyzing Magnets

Both magnets (a 48D48 and a 96D40) are to run with p_T = .3 GeV/c, $\int Bd\ell$ = 10 kg meters.

48D48 With a 36" gap (a minimum of 33.9" was requested) (standard gap is 18"), ℓ_{eff} = 62.3" (this comes from Kelvin Li data with mirror plates [see Fig. 1]). Therefore, B = 6.3 kg. The present coils will do this--the B_{max} is 18.5 kg with an 18" gap.

Field uniformity is a problem. We have decided to shim the gap as needed to improve the uniformity.

96D40 The required gap size is 43.3" and we have decided on a 44" gap, twice the standard gap. With this gap, we estimate that ℓ_{eff} = 54.8", using the 48D48 measurements for mirror plates. Therefore B = 7.2 kg. Since B_{max} = 10 kg for a 22" gap, additional coils were called for. Saddle

coils have been designed with the same cross section as the existing coils and these should be ordered by July 30th. The advantage to us in power usage of doing this versus pushing a 120D36 very hard is shown in Fig. 2 (from W. Leonhardt).

Since we have decided to create a window-frame magnet (i.e. not a split coil arrangement like the 48D48), the field quality should be excellent.

II. Experimental Area

An early layout is available dated 4/19/85. The changes requested are:

- a longer polarimeter (12 to 14 meters versus the 7 meters shown on the drawing.
- additional space to the sides of the lead glass and polarimeter (3.5 meters to each side).

We do not yet have trailer positions. The drawing shows the Christiansen trailer being used by 791, but it would be preferred to set up trailers in back of EEBA, in the B test beam trailer area. They will need a fast electronics trailer close to the lead glass region of their experiment, possibly between B5 and B1 or above their beam line. Since the trailer can't move, once installed, we need to understand E791's plans for their calorimeter before selecting a trailer position.

They have requested that the fast electronics trailer dimensions be 8' x 20', and three "main" trailers 3 x (8' x 20' x 8' high(?)). It is our guess that this main trailer space is too cramped.

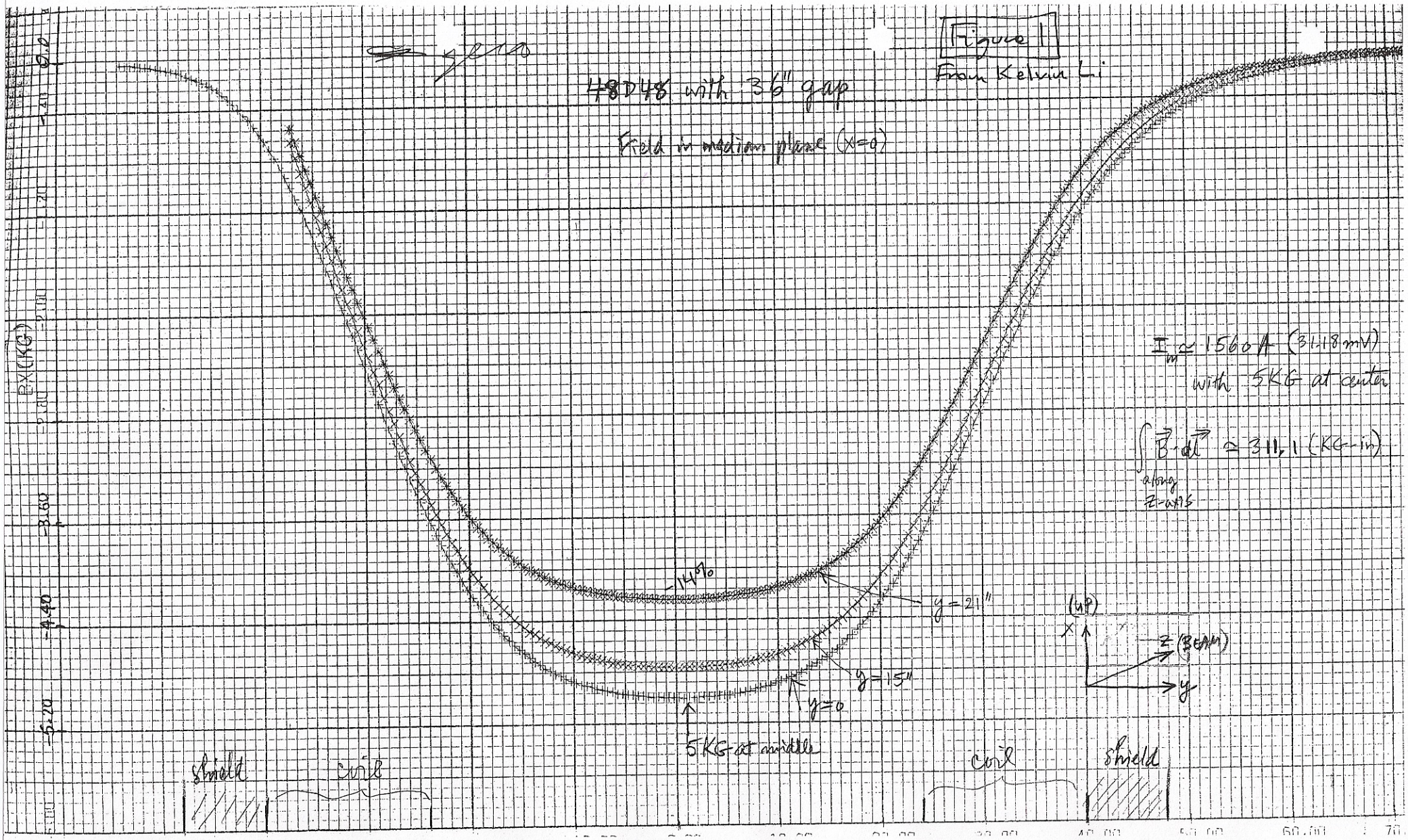
Figure 1
From Kelvin Li
48D48 with 36" gap
Field in median plane (x=0)
$I_m \simeq 1560A$ (3148mV)
with 5KG at center
$\int \vec{B} \cdot d\vec{l} \simeq 311.1$ (KG-in)
along Z-axis
BX(KG)
-14.40
y=21"
y=15"
y=0
5KG at middle
shield
coil
coil
shield
(up)
X
Z (BEAM)
y

Figure 2

WJL
2-5-85

ADDITIONAL COST OF ELECTRIC POWER FOR USING OTHER MAGNET OPTIONS THAN A 96D40 WITH BOOSTER COILS FOR EXP. 791
(POWER @ 75 $/MWH)