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FAST BACKLEG WINDING SUPPLY DESIGN PARAMETERS

J. G. Cottingham

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Collider Accelerator Department

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Accelerator Department
BROOKHAVEN NATIONAL LABORATORY
Associated Universities Inc.
Upton, New York

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J.G. Cottingham, A. Tranis, G.P. Bagley
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FAST BACKLEG WINDING SUPPLY DESIGN PARAMETERS

The Fast Backleg Winding Supply (FBLW) currently being designed to power the Fast Backleg Windings will be capable of deflecting the 28 GeV proton beam 1.8 in. (nom.) in either the $\frac{3}{2}\lambda$ backleg winding configuration or the $\frac{1}{2}\lambda$ configuration. Three interchangeable systems will be built; two to be operated in the $\frac{3}{2}\lambda$ configuration and one in the $\frac{1}{2}\lambda$ configuration.

Each FBLW will include two sub-units each of which will switch a charged capacitor bank on to backleg windings of half the magnets involved. A half sine wave current will then flow in both loops. Additional capacitors will be connected in when the FBLW is used in the $\frac{1}{2}\lambda$ configuration.

Detailed design parameters are given in Table I. The magnets will be wired as shown in Figs. 1 and 2.

TABLE I

	Min.	Nom.	Max.
Beam Deflection		1.8 in.	
Peak Current Per Unit ($\frac{3}{2}\lambda$)		625 A	750 A
Peak Current Per Unit ($\frac{1}{2}\lambda$)		1050 A	1500 A
Half Period		10 msec	
Load Inductance Per Unit ($\frac{3}{2}\lambda$)		1.8 mH	
Load Inductance Per Unit ($\frac{1}{2}\lambda$)		0.9 mH	
Q (estimate)		4	
Peak Voltage Per Unit		425 V	520 V
Power Required; 440 V, 3φ ($\frac{3}{2}\lambda$)			24 kW
Power Required; 440 V, 3φ ($\frac{1}{2}\lambda$)			48 kW
Pulses Per Magnet Cycle			4
Interval Between Pulse Initiations	100 msec		
Usable Interval ($\pm$ 1%)		1.1 msec	
RMS Current Per Loop ($\frac{3}{2}\lambda$, 4 pulses)			68 A
RMS Current Per Loop ($\frac{1}{2}\lambda$, 4 pulses)			136 A
C Per Unit ($\frac{3}{2}\lambda$)		5600 μf	
C Per Unit ($\frac{1}{2}\lambda$)		11,200 μf	

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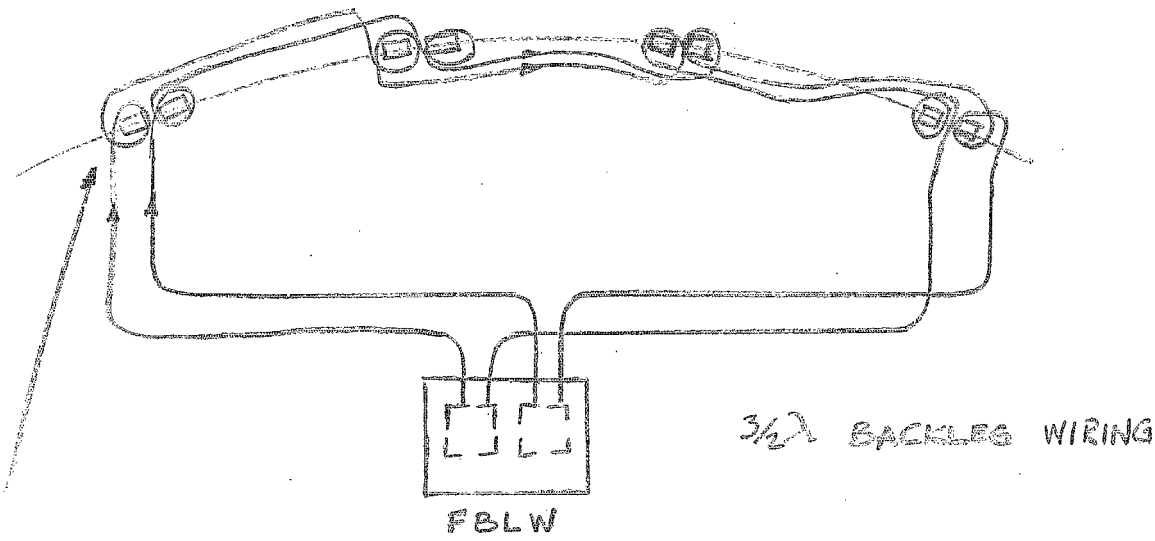

5 TURNS/LONG MAGNET
6 TUENS/SHORT MAGNET

Fig. 1

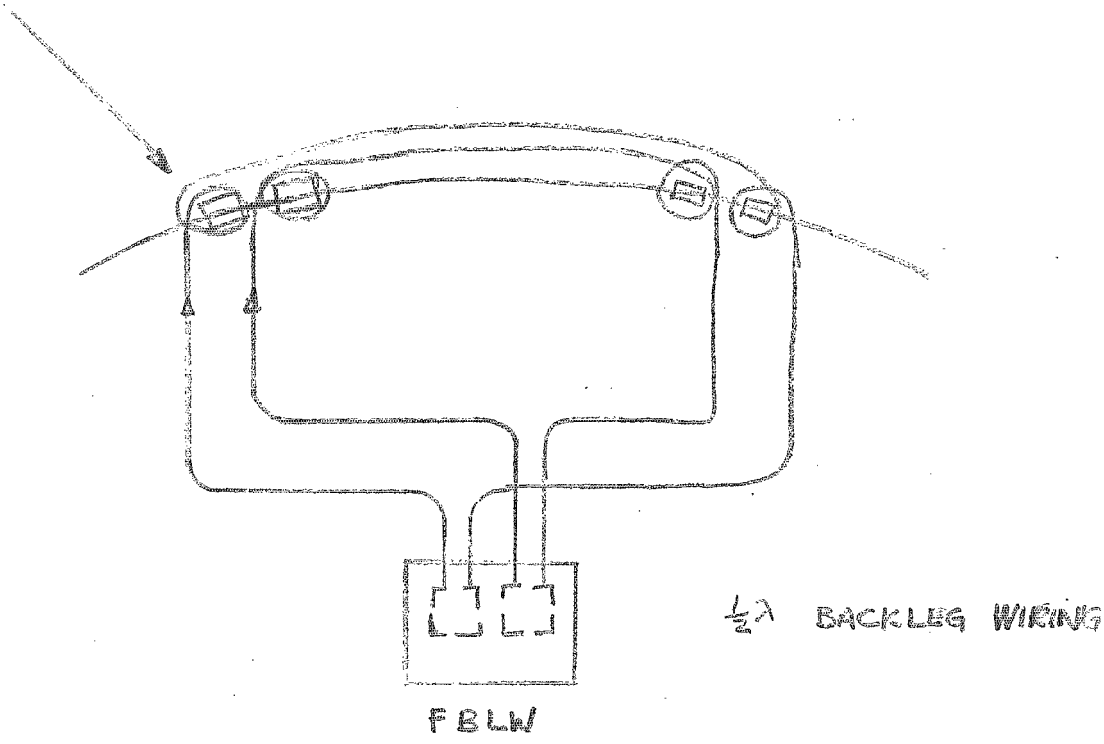

Fig. 2