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M E M O R A N D U M

To : Prof. B.H. Wiik, Chairman SPSC

From : G. Giacomelli, P. Lazeyras, M. Martemianov

Subject : WA 38 - A magnetic monopole search at the SPS

Two monopole targets, made of 5 cylinders, each 3 cm in diameter and 5 cm long, of tungsten-iron powder compound, were exposed to 400 GeV protons in front of the neutrino beam dumps.

The first target received 3×10^{17} protons. It was brought to the Kurchatov Institute (Moscow) where monopole extraction was attempted with a strong pulsed magnetic field. The emulsions placed on both sides of the targets were developed and analysed at the Kurchatov Institute. Similarly, plastic nitrocellulose films were analysed in Bologna. No magnetic monopole was found. This places an upper limit cross section for monopole production (95% confidence level):

$$\sigma \approx 3 \times 10^{-43} \text{ cm}^2 \text{ in 400 GeV pN collisions}$$

$$\sigma \approx 10^{-43} \text{ cm}^2 \text{ in } \approx 100 \text{ GeV } \pi\text{N collisions.}$$

The second monopole target, similar to the first one, was exposed from September 1979 till June 1980 in front of the neutrino beam dump. During this time, the narrow-band neutrino beam received 3.55×10^{18} protons and the wide-band neutrino beam received 4.44×10^{18} protons. Unfortunately there was an accident in the water cooling target system. This led to impossibility of using the second target in monopole extraction experiment.

Exposure of the third monopole target with necessary changes in the water cooling will be done as soon as possible in 1981-1982 in front of the neutrino beam dump.