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Professor W. Jentschke,
Norgestieg 1,
2 Hamburg 52,
W. Germany.



CM-P00063187

Telephone EUSton 7050

24 October 1969

re: Monopole search at I.S.R.

Dear Professor Jentschke,

For the past eighteen months, a group of physicists at University College, London, has been engaged in a search for magnetic monopoles. Until recently, this work has been confined mainly to an attempt to use a pulsed magnetic field to extract possible monopoles from the deep ocean floor sediment.

We have for some time now considered the possibility of conducting a search for monopoles produced by the ISR. Our interest in this problem was stimulated by the recent summary by Schwinger (Science, 169, page 757, 1969), in which he has sketched some of the interesting consequences of the possible existence of fundamental particles which are simultaneous carriers of electric and magnetic charge.

Two major consequences relating to the experimental observation of such particles which emerge from Schwinger's considerations are that

- a) The mass of such a "dyon" is estimated to be in the region of $6\text{GeV}/c^2$
- b) The magnetic charge is expected to be $4 \times$ the Dirac quantum of magnetic charge.

Although the mass estimate is open to criticism, since it is based on the construction of non-relativistic Hydrogen-like wave-functions of a pair of opposite magnetic charges, the large magnitude nevertheless may be a pointer as to why monopoles have so far not been observed in accelerator experiments. The value is, however, well within the range of masses which could be produced by the I.S.R.

The Schwinger value for the magnetic charge would imply that the rate of ionization of a fast dyon might be in the region of $100\text{ GeV}\cdot\text{gm}^{-1}\cdot\text{cm}^2$. If this were true, it would be difficult, if not impossible, to devise a vacuum box which can be penetrated by dyons. We are therefore led to suggest that we wish to conduct a search for dyons at the I.S.R. by placing suitable absorbers inside the vacuum box in a region where they would be exposed to secondary particles from an intersecting region.

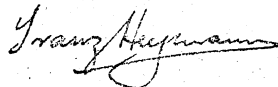
From discussions with members of the I.S.R. vacuum group, we are convinced that such a layer of absorbers could be arranged so as not to interfere in any way with normal I.S.R. operation. These could therefore be left in situ for quite lengthy periods prior to removal for examination.

We are currently evaluating the relative merits of a number of methods of obtaining a classically observable signal from a sample containing a magnetic

charge. We are, however, confident that it is easy to detect the presence of a single monopole with a sensitivity limit considerably better than one order of magnitude below the Dirac value. We do not think it necessary to describe the proposed detection techniques in the present letter, since we are still doing comparative feasibility studies.

The purpose of this letter is merely to inform you of our activities in this direction. We hope to present the I.S.R.C. with a full detailed proposal in the near future.

Yours sincerely,

A handwritten signature in cursive script, appearing to read "Franz Heymann". The signature is written in dark ink and is positioned above the typed name.

F.F. Heymann.