



Fermilab

June 13, 1983

Leon Lederman
Director

Dear Leon,

We intend to submit a proposal to measure the Ω^- polarization and magnetic moment. This is a fundamental measurement on a baryon state which has unique symmetry properties; namely, three strange quarks. The present world data on the Omega minus polarization and magnetic moment is contained in a thesis by K. Luk (Rutgers University 1983). Here the magnetic moment of -2.1 ± 1.0 nuclear magnetons is computed assuming the measured polarization of 0.12 ± 0.08 is non-zero. Although we view this as a pioneering effort, its large uncertainties make it of limited physics utility. We have demonstrated in E497 that our spectrometer is capable of kinematically identifying Omega minus from much larger flux of cascade minus (see attached figure). This experiment can be done either in the Energy Saver mode or the full Tevatron mode. What is needed is a trigger that will suppress the more copious cascades and also increase the rate capabilities of our spectrometer - both tractable problems.

At present, we are installing the equipment necessary to perform E715 in Proton Center. We are very excited about the prospects for that experiment. By early next year, we should have a preliminary indication with high statistics as to whether we confirm the previous low statistics measurements for Σ^- beta decay. Confirmation of the previous results, or in fact, any major disagreement of our measurements with current weak interaction models will be exciting. This would demand additional study of the semi-leptonic decay properties of polarized hyperons.

The Proton Center polarized charged hyperon beam is a unique facility with which to exploit either of the above experiments, and we believe both are worthy of further measurements. Preliminary results from E715 will crystalize our priorities. We would, of course, give top priority to any exciting new avenues suggested by these results.

However, our interest also runs high in doing the Omega minus polarization and magnetic moment measurement. Fortunately, because of a significant overlap in the apparatus we believe we can plan for either experiment without precluding the other. We plan to be ready for either in the latter half of the second running period (about January, 1985).

Sincerely yours,



Joseph Lach
For the Charged Hyperon Collaboration

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