Columbia discussions immediately preceding this experiment.

* Research supported in part by the joint program of the Office of Naval Research and the U. S. Atomic Energy Commission.

† Also at International Business Machines, Watson Scientific Laboratories, New York, New York.

[1] T. D. Lee and C. N. Yang, Phys. Rev. **104**, 254 (1956).

[2] Lee, Oehme, and Yang, Phys. Rev. (to be published).

[3] T. D. Lee and C. N. Yang, Phys. Rev. (to be published).

[4] R. Dalitz, Phil. Mag. **44**, 1068 (1953).

[5] T. D. Lee and C. N. Yang (private communication).

[6] Wu, Ambler, Hudson, Hoppes, and Hayward, Phys. Rev. **105**, 1413 (1957), preceding Letter.

[7] The Fierz-Pauli theory for spin $\frac{3}{2}$ particles predicts a g value of $\frac{2}{3}$. See F. J. Belinfante, Phys. Rev. **92**, 997 (1953).

[8] V. Fitch and J. Rainwater, Phys. Rev. **92**, 789 (1953).

[9] M. Weinrich and L. M. Lederman, *Proceedings of the CERN Symposium, Geneva, 1956* (European Organization of Nuclear Research, Geneva, 1956).

[10] The field interval, ΔH, between peak and valley in Fig. 2 gives the magnetic moment directly by $(\mu\Delta H/s\hbar)(t_1+\frac{1}{2}T)\delta=\pi$, where $\delta=1.06$ is a first-order resolution correction which takes into account the finite gate width and muon lifetime. The 5% uncertainty comes principally from lack of knowledge of the magnetic field in carbon. Independent evidence that $g=2$ (to $\sim$10%) comes from the coincidence of the polarization axis with the velocity vector of the stopped μ's. This implies that the spin precession frequency is identical to the μ cyclotron frequency during the 90° net magnetic deflection of the muon beam in transit from the cyclotron to the 1–2 telescope. We have designed a magnetic resonance experiment to determine the magnetic moment to $\sim$0.03%.

[11] *Note added in proof.*—We have now observed an energy dependence of a in the $1+a\cos\theta$ distribution which is somewhat less steep but in rough qualitative agreement with that predicted by the two-component neutrino theory $(\mu\rightarrow e+\nu+\bar{\nu})$ without derivative coupling. The peak-to-valley ratios for electrons traversing 9.3 g/cm², 15.6 g/cm², and 19.8 g/cm² of graphite are observed to be 1.80±0.07, 1.84±0.11, and 2.20±0.10, respectively.

Results from an Enriched Negative K-Meson Beam*

W. H. Barkas, W. F. Dudziak, P. C. Giles, H. H. Heckman, F. W. Inman, C. J. Mason, N. A. Nickols, and F. M. Smith

Radiation Laboratory, University of California, Berkeley, California

(Received December 26, 1956)

We have recently obtained a K^--meson beam from the Bevatron in which the intensity was greatly enhanced by selection of particles emitted in the forward direction. We further improved the usefulness of the beam incident on our emulsion stacks by causing the magnetically analyzed particles of 435 Mev/c to traverse a polystyrene degrader of 18.36 g/cm² and undergo a second bending of 180°, thus discarding the pion component of the beam. The remaining background tracks are chiefly muons and electrons. A small emulsion stack exposed in order to evaluate the beam has already yielded useful information. Although much more work is planned on this and a larger stack, some of the data now in hand are of sufficient interest and reliability for a preliminary report. In order to make quantitative measurements the emulsion density was carefully determined, and we employed our new range-energy curve.[1] The numbers in Table I were derived from along-the-track scanning of 1224 K mesons. Of these, 21 decayed in flight, 182 interacted inelastically in flight with emulsion nuclei, 6 scattered elastically from free protons in the emulsion, 2 interacted in flight with free protons to produce negative hyperons, and only 2 interacted at rest with free protons to produce charged hyperons (the two had opposite signs). The K-meson energy interval for which the interaction cross sections were calculated was 30 to 90 Mev. Analysis of hyperfragments and their parent stars was carried out on an IBM 650 digital computer using a program kindly supplied by Dr. C. Violet. We are greatly indebted to Ernestine Beleal, Anna-Mary Bush, Thoma Davis, John Dyer, Renée Feldman, Hester Lowe, Lynn Reynolds, and Toni Woodford for their conscientious scanning work.

Table I. Measurements obtained from the interaction and decay of negative K mesons in emulsion.

K^- mean life	$(1.46_{-0.31}^{+0.38})\times10^{-8}$ sec
K^--proton elastic scattering cross section	$(52_{-21}^{+31})\times10^{-27}$ cm²
K^- free path for inelastic collisions in emulsion	27.2± 2.3 cm
Σ^+ mass (from $\Sigma^+\rightarrow$proton decay)	(2327.8± 0.7) m_e
Σ^- mass (from $\Sigma^--\Sigma^+$ mass difference)	(2341.5± 2.3) m_e
K^- mass (from $K^-+p\rightarrow\Sigma^++\pi^-$ at rest)	(965.3± 1.5) m_e
K^- mass (from $K^-+p\rightarrow\Sigma^-+\pi^+$ in flight)	(961.4± 3.3) m_e
K^- mass (from K^-+p elastic collisions)	(978 ±25) m_e
Binding of Λ^0 in ${}_\Lambda He^5$	3.0± 0.6 Mev
Binding of Λ^0 in ${}_\Lambda He^4$	1.2± 1.0 Mev
Binding of Λ^0 in ${}_\Lambda Li^9$	3.8± 3.0 Mev
Decay branching ratio $(\Sigma^+\rightarrow p+\pi^0)/(\Sigma^+\rightarrow n+\pi^+)$	13/13
Frequency distribution of prongs from K^- stars at rest	
Prongs 0: 1: 2: 3: 4: 5:6:7:8:9	
Distrib. 36:43:63:30:28:20:9:2:2:1	
Frequency distribution of prongs from K^- stars in flight	
Prongs 0: 1: 2: 3: 4: 5:6:7:8:9:10:11:12	
Distrib. 16:22:46:34:31:14:8:4:0:1: 1: 0: 1	
Frequency distribution of prongs from K^- stars that emit hyperfragments	
Prongs 1:2: 3: 4:5:6:7:8	
Distrib. 1:3:11:12:6:3:2:3:1	
Frequency distribution of hyperfragment prongs	
Prongs 1: 2: 3:4:5:6:7	
Distrib. 4:11:15:5:3:1:1	
Frequency of hyperfragment emission from K^- stars	28/1152
Ratio of mesonic to nonmesonic decay of hyperfragments	9/42

* This work was done under the auspices of the U. S. Atomic Energy Commission.

[1] Barkas, Barrett, Cüer, Heckman, Smith, and Ticho, Phys. Rev. **102**, 583 (1956); **100**, 1797 (1955); and Bull. Am. Phys. Soc. Ser. II, **1**, 184 (1956).

Energy of Interacting Fermi Systems

C. DeDominicis* and P. C. Martin†

University of Birmingham, Birmingham, England, and Institute for Theoretical Physics, Copenhagen, Denmark

(Received December 26, 1956)

The purpose of this note is to make known a number of investigations concerning the energy of interacting Fermi systems. All of these investigations