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Longitudinal Stern-Gerlach DOUGLAS HIGINBOTHAM, Jefferson Lab — In 1922 Otto Stern and Walther Gerlach split a beam of silver atoms using a transverse gradient field. This experiment, which lead to the understanding that electrons have intrinsic spin, oddly enough does not work for free electrons due to the interplay between the Lorentz force and Heisenberg uncertainly principle. Recent calculations, Phys. Rev. Lett. 79 (1997) 4517 and Phys. Rev. Lett. 86 (2001) 4508, have shown that a dismissed idea of L. Brillouin from 1928 to use a longitudinal gradient field to minimize the effect of the Lorentz force may in fact be possible. The history of the Stern-Gerlach device will be presented along with the revived ideas for separating a beam of free electrons into its two spin states.

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