

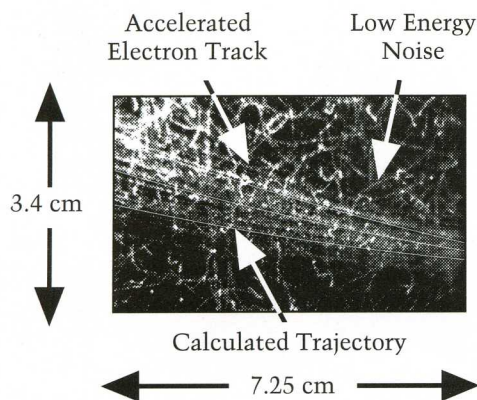
Beam Line

FOREFRONT ACCELERATORS

While most of the conference was devoted to conventional accelerators, there were important talks about advanced accelerator concepts and forefront applications. One session opened with John Blewett, the Wilson Prize winner this year, reminiscing about his career that started at the 1.3 MeV Van de Graaff and extended to work on the 200 GeV design that became Fermi National Accelerator Laboratory. It seemed appropriate that this eloquent reminder of the progress possible in a person's lifetime was followed by Christopher Clayton of UCLA reporting a major accomplishment in the field of advanced accelerators, the acceleration of electrons in a plasma accelerator.

THE 1993 PARTICLE ACCELERATOR CONFERENCE

by ROBERT SIEMANN



Cloud chamber tracks with an analyzing magnet set for 5.2 MeV, showing electrons accelerated by a plasma beat-wave. (Courtesy of Chris Clayton and Chan Joshi).

The UCLA laser acceleration group has accelerated injected electrons in a "beat-wave" accelerator where an accelerating gradient is developed in a plasma by the beating of two lasers with slightly different frequencies. In the past, field gradients produced by the beat-wave mechanism have been measured by laser light scattering, and acceleration of plasma electrons has been observed, but the UCLA experiment is the first demonstration of acceleration of injected electrons by a plasma beat-wave mechanism. Electrons with an energy of 2 MeV were accelerated up to 20 MeV in roughly 1 cm of plasma indicating a gradient of 1.8 GeV/m. There is a long way between results of this type and a working accelerator, but remarkable progress is possible in a person's lifetime.