Abstract Submitted
for the DNP19 Meeting of
The American Physical Society

Using timing to improve low-momentum tracking in silicon trackers SPENCER KLEIN, Lawrence Berkeley National Laboratory — Silicon detectors offer many advantages for tracking charged particles – they provide outstanding position resolution, so they provide unequalled resolution at for high momentum particles. However, the silicon detectors, being solid, induce more multiple scattering than gaseous trackers like TPCs. In this talk, I will explore the use of high-precision (˜10 -30 psec) timing to alleviate the effects of multiple scattering, by measuring directly the path-length that charged particles take between silicon detectors, and from that path length, the particle's curvature. A timing resolution of 30 psec has been demonstrated in silicon detectors, while 10 psec seems achievable in future devices. I will show that the use of timing can significantly improve the momentum resolution for lower momentum particles. This technique may be useful for detectors at a future Electron-Ion Collider. Time permitting, I will also discuss using timing to help reduce track confusion in high-luminosity environments.

Spencer Klein
Lawrence Berkeley National Laboratory

Date submitted: 21 Jun 2019 Electronic form version 1.4