

Abstract Submitted
for the SES06 Meeting of
The American Physical Society

Muon Ionization Cooling for an 8 TeV Lepton Collider¹ DON SUMMERS, University of Mississippi — A scenario for cooling muon bunches a factor of a million will be presented. Such cold muon bunches are the key to building an 8 TeV $\mu^+\mu^-$ lepton collider to explore the energy frontier. Ionization in hydrogen slows muons in all directions. RF cavities add momentum back in just one direction. Steps involved include a straight ionization/RF channel for initial transverse cooling, a *Guggenheim* spiral for 6D cooling, a slip stacking ring for bunch coalescence, two 6D ionization cooling rings, and a final straight transverse cooling channel employing 50 Tesla BSCCO superconducting solenoids filled with liquid hydrogen. A two megawatt proton source ($p \rightarrow \pi \rightarrow \mu$) appears to be adequate to provide high luminosity for a $\mu^+\mu^-$ collider. A program to learn how to build 50 Tesla solenoids has commenced at Fermilab. Other labs and universities are collaborating. Currently, 25 Tesla solenoids have been built. The current carrying capacity of BSCCO has been measured to be 266 Amps/mm² at 45 Tesla and 4⁰ K in Florida.

¹Work supported by DOE grant DE-FG05-91ER40622.

Don Summers
University of Mississippi

Date submitted: 21 Aug 2006

Electronic form version 1.4