

Advanced Accelerator R&D at the Cornell Electron Storage Ring

-- Eric Wilkinson --

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CLASSE



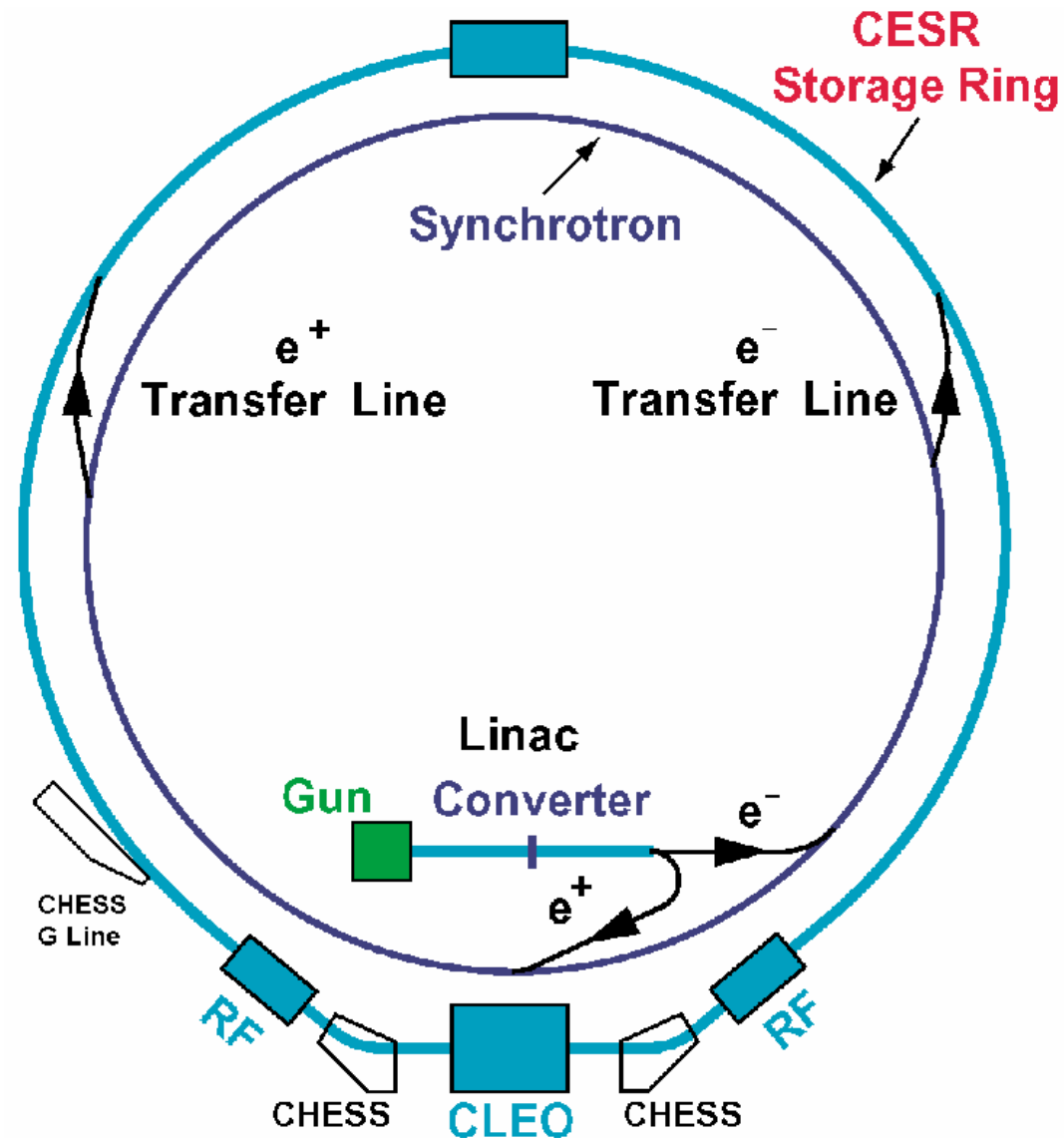
The Storage Ring

Abstract

The reconfiguration of the Cornell Electron Storage Ring from an electron-positron collider to a *test facility for state-of-the-art accelerator physics R&D* has been completed in 2008. The year 2009 will see the experimental measurements in a program which combines the study of synchrotron-radiation-induced electron cloud formation with optics design for extremely small beams such as are required at a future high-energy linear e^+e^- collider. *Particularly relevant to the 2009 REU program are the data runs scheduled for June and July, 2009.*

The widespread enthusiasm among particle physicists for the discovery potential of a 20-mile long *International Linear Collider (ILC)* to study the interactions of 500 GeV electrons and positrons has resulted in a global effort to which *LEPP* is making a variety of essential contributions.

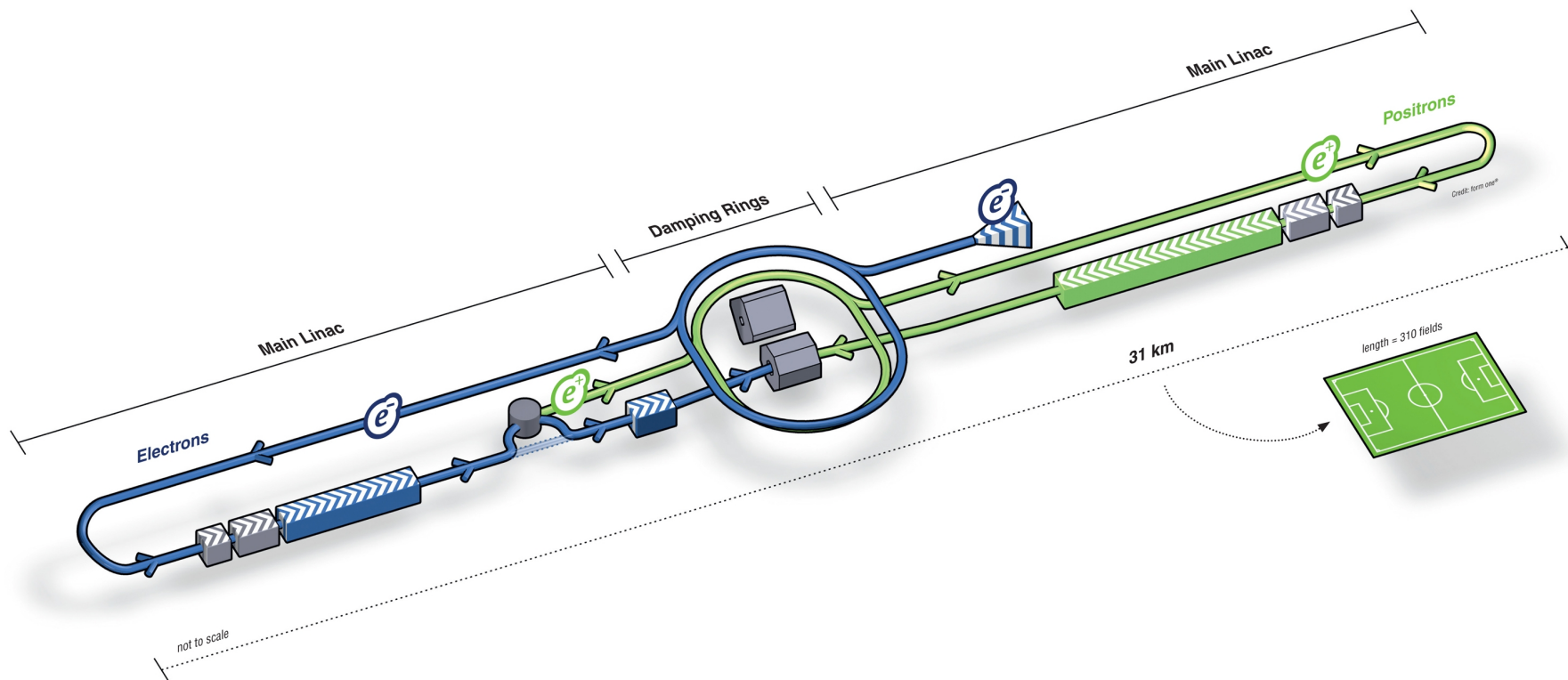
This REU project will focus on this new high-priority mission of CESR which includes both software simulation and experimental measurement.





Electron cloud buildup in the damping rings is considered the primary limitation on the colliding beam intensity.

As a consequence, this topic has been given top priority in the ILC damping ring R&D program.





L3 Electron cloud experimental region

PEP-II EC Hardware:

Chicane, upgraded SEY station

(commissioning in May/June 2009)

Drift and Quadrupole diagnostic chambers

*New electron cloud experimental regions in arcs near L1 and L5
(after 6 wigglers moved to L0 straight)*

**Locations for collaborator experimental
vacuum chambers**

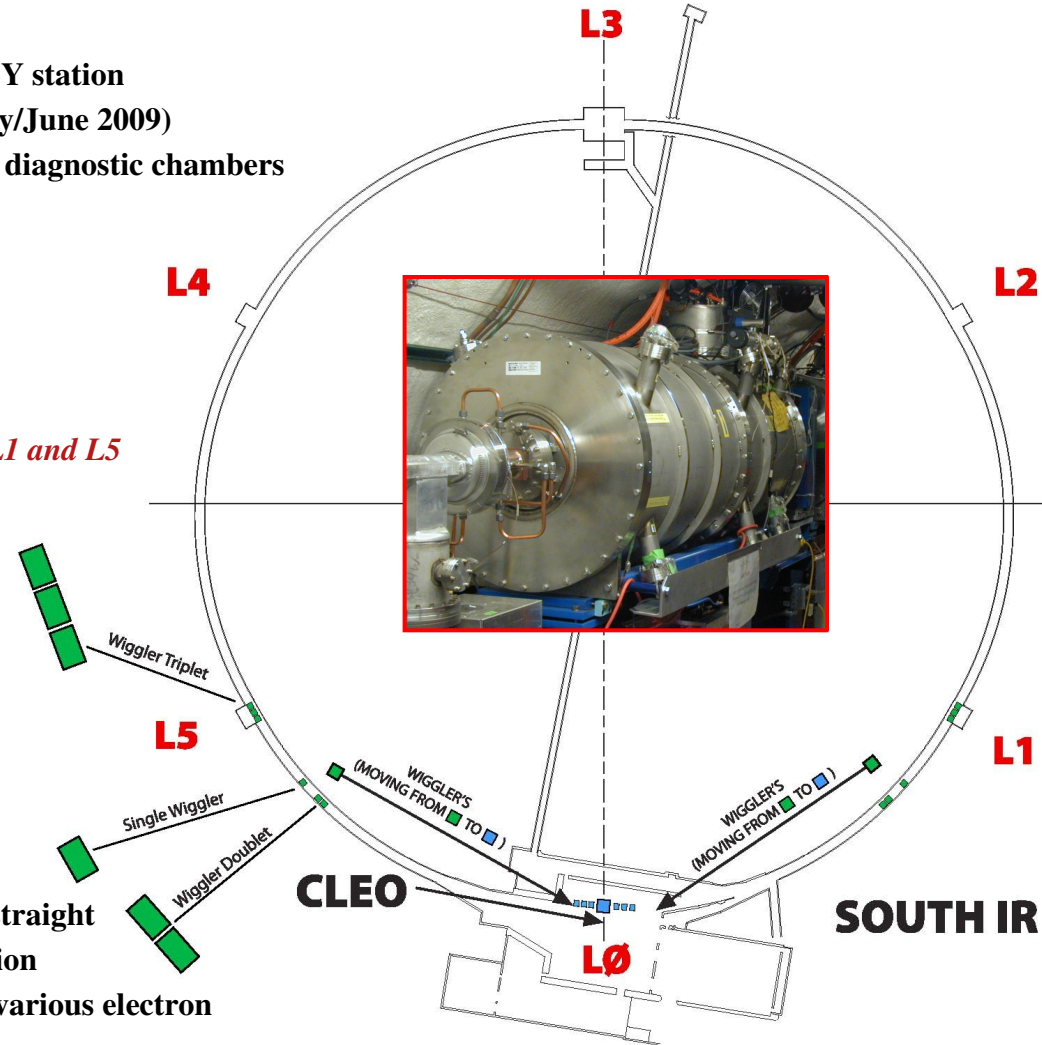
L0 region reconfigured as a wiggler straight

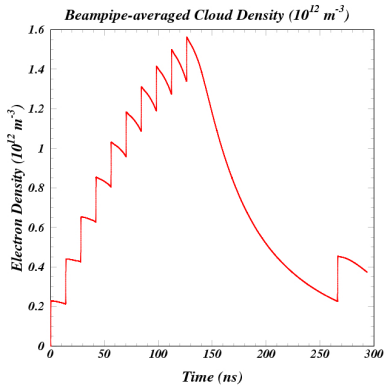
CLEO detector sub-systems removed

6 wigglers moved from CESR arcs to zero dispersion straight

Region instrumented with EC diagnostics and mitigation

**Wiggler chambers with retarding field analyzers and various electron
cloud mitigation methods**





Field-free region

Vertical Magnetic Field
700 Gauss

