

ACCELERATOR SEMINAR

“Twin-Helix Magnetic Channel for Parametric-resonance Ionization Cooling”

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Parametric-resonance Ionization Cooling (PIC) is planned as the final 6D muon beam cooling stage critical for the feasibility of a high-luminosity muon collider. Implementing PIC imposes stringent constraints on the cooling channel's magnetic optics design. This presentation will discuss a proposed linear optics solution compatible with PIC. The solution consists of a superposition of two opposite-helicity equal-period and equal-strength helical dipole harmonics and a normal continuous quadrupole. It will be demonstrated that such a system can be adjusted to meet all of the PIC linear optics requirements while retaining large acceptance. Possible practical implementations of such a channel will be suggested. Such a channel can also be used for further deep transverse muon emittance reduction by fast reverse emittance exchange. An approach to compensating 2nd- and 3rd-order aberrations at the cooling absorber locations in the channel will be discussed. The approach is based on employing specially-arranged symmetry of the orbital motion and magnetic field components to reduce the number of aberration compensation conditions. The effectiveness of this approach will be demonstrated on a conceptually very similar but somewhat simpler problem of aberration compensation at a collider interaction point.

Thursday, June 3, 2010

3:30 p.m. – 4:30 p.m.

CEBAF Center, Room L102/104