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Exploration of a High Luminosity 100 TeV Proton-Antiproton Collider SANDRA OLIVEROS, DONALD SUMMERS, LUCIEN CREMALDI, JOHN ACOSTA, University of Mississippi - Oxford — I will describe a 200 km circumference, $10^{34}\,cm^{-2}\,s^{-1}$ luminosity 100 TeV proton-antiproton collider which could be constructed at CERN and connected to the LHC tunnel. A Fermilab-like antiproton source would be adapted with a dipole to disperse the antiprotons into 12 different momentum channels using electrostatic septa. This gives 12x more antiprotons to keep up with the high luminosity antiproton burn rate. Because the stochastic cooling time scales as the number of particles, the antiprotons would be stochastically cooled in 12 debuncher/momentum equalizer and 24 accumulator rings in parallel before electron cooling. Additionally, the antiprotons in the collider ring would be recycled during runs without leaving the collider ring, by joining them to new bunches with snap bunch coalescence and synchrotron damping. In proton-antiproton collisions, the cross sections for many high mass states is 10 times higher than in proton-proton collisions because antiquarks can come directly from antiprotons rather than gluon splitting. This allows lower beam currents, which reduces synchrotron radiation into superconducting magnets and vacuum systems. Finally, events are more central, allowing a shorter detector and a smaller β^* for higher luminosity.

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