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A complete six-dimensional beam cooling scheme for a Muon Collider DIKTYS STRATAKIS, SCOTT BERG, ROBERT PALMER, Brookhaven National Laboratory — A high luminosity muon collider requires a significant reduction of the six-dimensional emittance prior acceleration. Obtaining the desired emittances requires transporting the muon beam through long section of a beam channel containing rf cavities, absorbers, and focusing solenoids. Here we propose new scheme to improve the performance of the channel, consequently increasing the number of transmitted muons and the lattice cooling efficiency. The key idea of our scheme is to tune progressively the main lattice parameters, such as the cell dimensions, rf frequency, and coil strengths, while always keeping the beam emittance significantly above the equilibrium value. We the aid of this novel approach we present for the first time a complete cooling scheme for a Muon Collider, and demonstrate a notable 6D emittance decrease by five order of magnitude. We review key parameters such as the required fields, frequencies and gradients for a complete muon cooling scenario.

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