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Toward a proof-of-principle experiment of Optical Stochastic Cooling

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Owing to the superior bandwidth of amplifiers at optical wavelengths the Optical Stochastic Cooling (OSC) technique was first proposed more than 20 years ago as a radical improvement of the widely used Stochastic Cooling operating in the microwave regime. Fermilab is currently developing a proof-of-principle experiment of the OSC method using a 100-MeV electron beam circulating in the compact IOTA ring. The developed capabilities are generic and could have applications to optical manipulations of electron beams beyond OSC. This paper report on the development of an optical amplifier capable of amplifying undulator radiation along with simulations of the OSC insertion beamline.

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