IOP Publishing Plasma Physics and Controlled Fusion

Plasma Phys. Control. Fusion **53** (2011) 014010 (13pp) doi:10.1088/0741-3335/53/1/014010

Optical injector based on particle acceleration by stimulated emission of radiation in a Penning trap

Levi Schächter

Department of Electrical Engineering, Technion, Israel Institute of Technology, Haifa 32000, Israel

E-mail: levi@ee.technion.ac.il

Received 24 September 2009, in final form 24 April 2010
Published 16 December 2010
Online at stacks.iop.org/PPCF/53/014010

Abstract

We present results of a 1D analysis demonstrating that electrons oscillating in a Penning trap may drain the energy stored in an adjacent active medium. Consequently, energy imparted by the active medium to the electrons allows them to leave the trap. A simplified configuration is analysed in a self-consistent way and its equilibrium conditions are characterized assuming continuous pumping of the medium.