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(54) Title: SPHERICAL INERTIAL ELECTROSTATIC CONFINEMENT DEVICE AS A TUNABLE X-RAY SOURCE

(57) Abstract

A low cost small-scale tunable X-ray source, comprising a spherical-electron injected inertial electrostatic confinement (IEC) device. Within a spherical containment vessel (402) recirculatory focusing electrons are accelerated by a spherical grid (401) within the vessel, and cause electron-electron collisions in a dense, central plasma core region (404) of the sphere. The IEC synchrotron source (IEC-SS) in a mechanism for generating tunable X-ray radiation is essentially equivalent to that for conventional synchrotron sources. The IEC-SS operates at a much lower electron energy (< 100 keV compared with > 200 MeV in a synchrotron), but still gives the same X-ray energy due to the small-scale bending radius associated with the electron-electron interactions. The X-rays can be filtered for particular purposes using diffraction gratings, prisms or the like.

IEC TUNABLE X-RAY SOURCE CONCEPT