599.标题: Generation of THz Radiation from Laser Beam Filamentation in a Magnetized Plasma
作者: Singh, M (Singh, M.); Mahmoud, ST (Mahmoud, S. T.); Sharma, RP (Sharma, R. P.)
来源出版物: CONTRIBUTIONS TO PLASMA PHYSICS 卷: 52 期: 4 页: 243-250 DOI: 10.1002/ctpp.201100058 出版年: MAY 2012
在 Web of Science 中的被引频次: 0
被引频次合计: 0
引用的参考文献数: 30
摘要: The terahertz (THz) frequency radiation production as a result of nonlinear interaction of high intense laser beam with low density ripple in a magnetized plasma has been studied. If the appropriate phase matching conditions are satisfied and the frequency of the ripple is appropriate then this difference frequency can be brought in the THz range. Self focusing (filamentation) of a circularly polarized beam propagating along the direction of static magnetic field in plasma is first investigated within extended-paraxial ray approximation. The beam gets focused when the initial power of the laser beam is greater than its critical power. Resulting localized beam couples with the pre-existing density ripple to produce a nonlinear current driving the THz radiation. By changing the strength of the magnetic field, one can enhance or suppress the THz emission. The expressions for the laser beam width parameter, the electric field vector of the THz wave have been obtained. For typical laser beam and plasma parameters with the incident laser intensity approximate to 10(14) W/cm(2), laser beam radius (r(0)) = 50 mu m, laser frequency (omega(0)) = 1.8848 x 10(14) rad/s, electron plasma (low density rippled) wave frequency (omega(0)) = 1.2848 x 10(14) rad/s, plasma density (n(0)) = 5.025 x 10(17) cm(-3), normalized ripple density amplitude (mu)=0.1, the produced THz emission can be at the level of Giga watt (GW) in power.

入藏号: WOS:000303601900001
语种: English
文献类型: Article
作者关键词: Plasma wave; self-focusing; ponderomotive nonlinearity; extended paraxial ray approximation; THz radiation
KeyWords Plus: TERAHERTZ RADIATION; IDENTIFICATION; SYSTEM; PULSE
地址: [Singh, M.; Sharma, R. P.] Indian Inst Technol Delhi, Ctr Energy Studies, New Delhi 110016, India
[Mahmoud, S. T.] United Arab Emirates Univ, Dept Phys, Al Ain 17551, U Arab Emirates
通讯作者地址: Singh, M (通讯作者),Indian Inst Technol Delhi, Ctr Energy Studies, New Delhi 110016, India
电子邮件地址: monikaiitd09@gmail.com
出版商: WILEY-V C H VERLAG GMBH
出版商地址: PO BOX 10 11 61, D-69451 WEINHEIM, GERMANY
Web of Science 分类: Physics, Fluids & Plasmas
学科类别: Physics
IDS 号: 936PG
ISSN: 0863-1042
29 字符的来源出版物名称缩写: CONTRIB PLASM PHYS
ISO 来源出版物缩写: Contrib. Plasma Phys.
来源出版物页码计数: 8