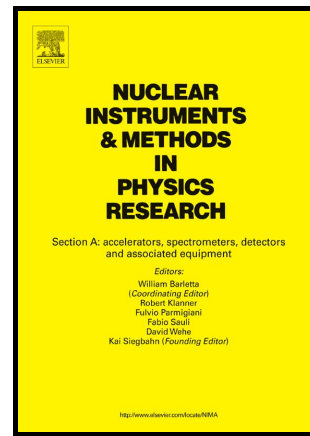


# Author's Accepted Manuscript

Generation of high harmonic free electron laser  
with phase-merging effect

Heting Li, Qika Jia, Zhouyu Zhao



[www.elsevier.com/locate/nima](http://www.elsevier.com/locate/nima)

PII: S0168-9002(16)31137-8  
DOI: <http://dx.doi.org/10.1016/j.nima.2016.11.018>  
Reference: NIMA59437

To appear in: *Nuclear Inst. and Methods in Physics Research, A*

Received date: 7 September 2016  
Revised date: 21 October 2016  
Accepted date: 7 November 2016

Cite this article as: Heting Li, Qika Jia and Zhouyu Zhao, Generation of high harmonic free electron laser with phase-merging effect, *Nuclear Inst. and Methods in Physics Research, A*, <http://dx.doi.org/10.1016/j.nima.2016.11.018>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and a review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Generation of high harmonic free electron laser with phase-merging effect

Heting Li\*, Qika Jia, Zhouyu Zhao

*National Synchrotron Radiation Laboratory, University of Science and Technology of China, Hefei, Anhui, 230029, China*

---

## Abstract

An easy-to-implement scheme is proposed to produce the longitudinal electron bunch density modulation with phase-merging phenomenon. In this scheme an electron bunch is firstly transversely dispersed in a modified dog-leg to generate the exact dependence of electron energy on the transverse position, then it is modulated in a normal modulator. After travelling through a modified chicane with specially designed transfer matrix elements, the density modulation with phase-merging effect is generated which contains high harmonic components of the seed laser. We present theoretical analysis and numerical simulations for seeded soft x-ray free-electron laser. The results demonstrate that this technique can significantly enhance the frequency up-conversion efficiency and allow a seeded FEL operating at very high harmonics.

*Keywords:* free-electron laser, harmonic generation, phase-merging effect, bunching factor

*PACS:* 41.60.Cr, 41.85.Ct

---

\*Corresponding author. Email: liheting@ustc.edu.cn

Download English Version:

<https://daneshyari.com/en/article/5493313>

Download Persian Version:

<https://daneshyari.com/article/5493313>

[Daneshyari.com](https://daneshyari.com)