

Title (en)

Refractive optics for gamma-photons

Title (de)

Refraktive Optik für Gamma-Photonen

Title (fr)

Optiques à réfraction pour photons gamma

Publication

EP 2592627 A1 20130515 (EN)

Application

EP 11195264 A 20111222

Priority

- EP 11188251 A 20111108
- EP 11195264 A 20111222

Abstract (en)

The present invention relates to a use of one or more refractive optical elements for shaping, deflecting and/or guiding by total internal reflection a beam of γ -photons having an energy for which the energy dependent index of refraction of the material of said refractive optical element has a real part that is larger than 1.

IPC 8 full level

G21K 1/06 (2006.01)

CPC (source: EP)

G21K 1/06 (2013.01); **G21K 1/065** (2013.01); **G21K 2201/064** (2013.01); **G21K 2201/067** (2013.01)

Citation (applicant)

- HR. WELLER ET AL., PROG. PART. NUCL. PHYS., vol. 62, 2009, pages 257
- J. S. TOLL, THE DISPERSION RELATION FOR LIGHT AND THE APPLICATIONS INVOLVING ELECTRON PAIRS, PRINCETON UNIVERSITY, 1952
- E.G. KESSLER, NUCL INST. METH. A, vol. 457, 2001, pages 187
- KESSLER ET AL., NUCL INST. METH. A, vol. 457, 2001, pages 187
- EG. KESSLER ET AL., NUCL INST. METH. A, vol. 457, 2001, pages 187
- R.L. MÖSSBAUER: "Recoilless Nuclear Resonance Absorption", ANN. REV. NUCL. SCI., vol. 12, 1962, pages 123
- R.L. MÖSSBAUER, Z.F. PHYSIK, vol. 151, 1958, pages 124
- HA. BETHE; F. ROHRLICH, PHYS. REV., vol. 86, 1952, pages 10
- F. ROHRLICH ET AL., PHYS. REV., vol. 86, 1952, pages 1
- BETHE; HA. BETHE; F. ROHRLICH ET AL., PHYS. REV., vol. 86, 1952, pages 10
- F. ROHRLICH ET AL., PHYS. REV., vol. 86, no. 1, 1952
- H.A. BETHE ET AL., PROC. ROY. SOC. (LONDON, vol. 146, 1934, pages 83
- D.M. PAGANIN: "Coherent X-Ray Optics", 2006, OXFORD UNIVERSITY PRESS
- E.G. KESSLER ET AL., NUCL INST. METH. A, vol. 457, 2001, pages 187
- D. HABS; U. KOSTER, APPL. PHYS. B, vol. 103, 2011, pages 501
- HABS ET AL., APP. PHYS. B, vol. 103, 2011, pages 485
- C. HUGENSCHMIDT ET AL., APPL. PHYS. B, 2011
- C. G. SCHROER ET AL., PHYS. REV. LET., vol. 1001, 2008, pages 090801
- D.M. PAGANIN: "Coherent X-Ray Optics", 2006, OXFORD UNIVERSITY PRESS

Citation (search report)

- [X] US 2010296171 A1 20101125 - LEE SUSANNE MADELINE [US], et al
- [A] DD 133487 A1 19790103 - BOTHE HANS KARL, et al
- [A] US 2008019482 A1 20080124 - YONEYAMA AKIO [JP], et al
- [XA] D. HABS ET AL: "Intense, brilliant micro [gamma]-beams in nuclear physics and applications", PROCEEDINGS OF SPIE, vol. 8075, 5 May 2011 (2011-05-05), pages 807507, XP055049819, ISSN: 0277-786X, DOI: 10.1117/12.891512
- [X] ALEXEI ERKO, MOURAD IDIR, THOMAS KRIST, ALAN G. MICHETTE: "Modern Developments in X-Ray and Neutron Optics", 2008, SPRINGER BERLIN HEIDELBERG NEW YORK, ISBN: 978-3-540-74560-0, article A. SNIGIREV, I. SNIGIREVA: "Hard X-Ray Microoptics", pages: 260 - 279, XP002690461
- [XI] GERALD K. SKINNER: "Design and Imaging Performance of Achromatic Diffractive-Refractive X-Ray and Gamma-Ray Fresnel Lenses", APPLIED OPTICS, vol. 43, no. 25, 1 January 2004 (2004-01-01), pages 4845, XP055049669, ISSN: 0003-6935, DOI: 10.1364/AO.43.004845
- [A] TAKEYAMA A ET AL: "Computed tomography for reconstructing refractive index distribution using an X-ray shearing interferometer", SICE. PROCEEDINGS OF THE SICE ANNUAL CONFERENCE. INTERNATIONALSESSION PAPERS, TOKYO, JP, vol. 4, 7 August 2002 (2002-08-07), pages 2524 - 2526, XP008096633

Cited by

CN104681118A

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)

BA ME

DOCDB simple family (publication)

EP 2592626 A1 20130515; EP 2592627 A1 20130515; WO 2013068078 A1 20130516; WO 2013068079 A1 20130516

DOCDB simple family (application)

EP 11195252 A 20111222; EP 11195264 A 20111222; EP 2012004494 W 20121026; EP 2012004495 W 20121026