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At x-ray and gamma-ray wavelengths the real part of the refractive index of a material is usually written \( \Re \mu = 1 - \alpha \), where \( \alpha \) is small and positive \( 10^{-3} \) to \( 10^{-10} \), corresponding to refractive indices slightly less than unity. At high energies and away from absorption edges, \( \alpha \) is approximately proportional to \( \alpha^2 \), leading to a variation of the focal length of a refractive lens, \( D \propto 1/\alpha \).  


D. Faklis and G. M. Morris, Broadband imaging with holographic lenses, Opt. PROCEEDINGS OF SPIE Optics for EUV, X-Ray, and Gamma-Ray Astronomy VI Stephen L. O'Dell Giovanni Pareschi Editors 26â€“29 August 2013 San Diego, California, United States Sponsored and Published by SPIE Volume 8861 Proceedings of SPIE 0277-7867-8861X, V.8861 SPIE is an international society advancing an interdisciplinary approach to the science and application of light. Optics for EUV, X-Ray, and Gamma-Ray Astronomy VI, edited by Stephen L. O'Dell, Giovanni Pareschi, Proc. of SPIE Vol. 8861, 886101 â€“ Â© 2013 SPIE CCC code: 0277-7867/13/$18 Â· doi: 10.1117/12.2046477 Proc. of SPIE Vol. 8861 The astronomical use of X-ray and gamma-ray PFLs has been discussed by Skinnerâ€“6 (see also the suggestions of Gorenstein for X-ray applications). The possible applications fall into two classes. In the first the main interest is in the superb angular resolution possible with this technique. The second class of applications uses PFLs to overcome the present impasse in gamma-ray astronomy in which scaling up of existing technologies to improve their sensitivity is impractical and maybe even counterproductive (because larger systems require larger shields that both lead to worse dead-time lo 1 SPIE Optics for EUV, X-Ray, and Gamma-Ray Astronomy VI Montreal 2014 June 27th â€“ 29th Science requirements and optimization of the silicon pore optics design for the Athena mirror Dick Willingale University of Leicester G. Pareschi, F. Christensen, J-W. den Herder, D. Ferreira, A. Jakobsen, M. Ackermann, M. Collon, M. Bavdaz. Athena+, ESAâ€™s next generation X-ray observatory Gregor Rauw High-Energy Astrophysics Group LiÃ¨ge University on behalf of the Athena+ coordination group. SIW 2003 The antenna element Ravi ATNF, Narrabri 1. The role of the antenna in a Fourier synthesis radio telescope 2. The Compact array antenna. Multilayer Overview Current application Optimization of Multilayers Model Designs for GRI. X-ray optics is the branch of optics that manipulates X-rays instead of visible light. It deals with focusing and other ways of manipulating the X-ray beams for research techniques such as X-ray crystallography, X-ray fluorescence, small-angle X-ray scattering, X-ray microscopy, X-ray phase-contrast imaging, X-ray astronomy etc. Since X-rays and visible light are both electromagnetic waves they propagate in space in the same way, but because of the much higher frequency and photon energy of X-rays