

313. Accession number:20122915254923

Title:Generation of broadband spontaneous parametric fluorescence using multiple bulk nonlinear crystals

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Source title:Optics Express

Abbreviated source title:Opt. Express

Volume:20

Issue:13

Issue date:June 18, 2012

Publication year:2012

Pages:13977-13987

Language:English

E-ISSN:10944087

Document type:Journal article (JA)

Publisher:Optical Society of America, 2010 Massachusetts Avenue NW, Washington, DC 20036-1023, United States

Abstract:We propose a novel method for generating broadband spontaneous parametric fluorescence by using a set of bulk nonlinear crystals (NLCs). We also demonstrate this scheme experimentally. Our method employs a superposition of spontaneous parametric fluorescence spectra generated using multiple bulk NLCs. A typical bandwidth of 160 nm (73 THz) with a degenerate wavelength of 808 nm was achieved using two  $\beta$ -barium-borate (BBO) crystals, whereas a typical bandwidth of 75 nm (34 THz) was realized using a single BBO crystal. We also observed coincidence counts of generated photon pairs in a non-collinear configuration. The bandwidth could be further broadened by increasing the number of NLCs. Our demonstration suggests that a set of four BBO crystals could realize a bandwidth of approximately 215 nm (100 THz). We also discuss the stability of Hong-Ou-Mandel two-photon interference between the parametric fluorescence generated by this scheme. Our simple scheme is easy to implement with conventional NLCs and does not require special devices. © 2012 Optical Society of America.

Number of references:29

Main heading:Fluorescence

Controlled terms:Bandwidth - Barium - Nonlinear optics - Photons

Uncontrolled terms:BBO crystals - Nonlinear crystals - Parametric fluorescence - Photon pairs - Special devices - Two-photon interference

Classification code:549.2 Alkaline Earth Metals - 716.1 Information Theory and Signal Processing - 741.1 Light/Optics - 741.1.1 Nonlinear Optics

DOI:10.1364/OE.20.013977

Database:Compendex

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