

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
6 March 2003 (06.03.2003)

PCT

(10) International Publication Number
WO 03/019284 A3

(51) International Patent Classification⁷: G02F 1/35

37922 (US). RICHARDS, Roger, K. [US/US]; 2613 Blue Meadow Lane, Knoxville, TN 37932 (US).

(21) International Application Number: PCT/US02/26838

(74) Agent: BRUCKNER, John, J.; Gray Cary Ware & Freidenrich LLP, 1221 S. MoPac Expressway, Suite 400, Austin, TX 78746-6875 (US).

(22) International Filing Date: 23 August 2002 (23.08.2002)

(25) Filing Language: English

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(26) Publication Language: English

(30) Priority Data:
09/938,843 24 August 2001 (24.08.2001) US
09/939,303 24 August 2001 (24.08.2001) US
10/226,164 22 August 2002 (22.08.2002) US

(71) Applicant (for all designated States except US): UT-BAT-TELLE, LLC [US/US]; Oak Ridge National Laboratory, Bethel Valley Road, P.O. Box 2008, Oak Ridge, TN 37831-6255 (US).

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

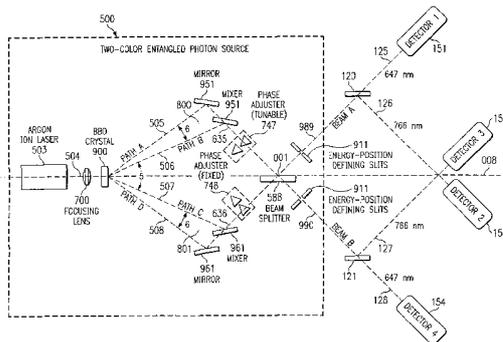
(71) Applicants and

(72) Inventors: DRESS, William, B. [US/US]; 1239 NW Lacomas Drive, Camas, WA 98607 (US). KISNER, Roger, A. [US/US]; 12404 Camdenbridge Drive, Knoxville, TN

Published: — with international search report

[Continued on next page]

(54) Title: INTERFEROMETRIC SOURCE OF MULTI-COLOR, MULTI-BEAM ENTANGLED PHOTONS



(57) Abstract: Systems and methods are described for an interferometric source (500) of multi-color, multi-beam entangled photons. A method includes: downconverting a beam of coherent energy to provide a beam of multi-color entangled photons; converging two spatially resolved portions of the beam of multi-color entangled photons into a converged multi-color entangled photon beam; changing a phase of at least a portion of the converged multi-color entangled photon beam to generate a first interferometric multi-color entangled photon beam; and combining the first interferometric multi-color entangled photon beam with a second interferometric multi-color entangled photon beam within a single beamsplitter (588). An apparatus includes: a multi-refractive device (900) optically coupled to a source of coherent energy (503), the multi-refractive device (900) providing a beam of multi-color entangled photons; a condenser device (951, 961) optically coupled to the multi-refractive device the condenser device (951, 961) converging two spatially resolved portions of the beam of multi-color entangled photons into a converged multi-color entangled photon beam; a tunable phase adjuster (747) optically coupled to the condenser device (951, 961), the tunable phase adjuster (747) changing a phase of at least a portion of the converged multi-color entangled photon beam to generate a first interferometric multi-color entangled photon beam; and a beam splitter (588) optically coupled to the condenser device (951, 961), the beam splitter (588) combining the first interferometric multi-color entangled photon beam with a second interferometric multi-color entangled photon beam.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(88) Date of publication of the international search report:

22 May 2003

INTERNATIONAL SEARCH REPORT

PCT/US 52/26838

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 G02F1/35		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) IPC 7 G02F		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) INSPEC, EPO-Internal, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	RARITY J G ET AL: "Two-color photons and nonlocality in fourth-order interference" PHYSICAL REVIEW A (ATOMIC, MOLECULAR, AND OPTICAL PHYSICS), 1 MAY 1990, USA, vol. 41, no. 9, pages 5139-5146, XP002233565 ISSN: 0556-2791 cited in the application abstract ---	1,8
A	LARCHUK T S ET AL: "Interfering entangled photons of different colors" PHYSICAL REVIEW LETTERS, 15 MARCH 1993, USA, vol. 70, no. 11, pages 1603-1606, XP002233566 ISSN: 0031-9007 abstract --- -/--	1,8
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° Special categories of cited documents :		
A document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *Z* document member of the same patent family	
Date of the actual completion of the international search 5 March 2003		Date of mailing of the international search report 21/03/2003
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer Galanti, M

INTERNATIONAL SEARCH REPORT

PCT/US 92/26838

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>SHIMIZU KAORU ET AL: "Quantum communication with a 2-bit message coding for each transmitted photon" TECHNICAL DIGEST. CLEO/PACIFIC RIM. THE PACIFIC RIM CONFERENCE ON LASERS AND ELECTRO-OPTICS, XX, XX, 1997, pages 79-80, XP002112182 figure 1</p> <p style="text-align: center;">---</p>	1,8
A	<p>YOON-HO KIM ET AL: "Bell-state preparation using pulsed nondegenerate two-photon entanglement" PHYSICAL REVIEW A (ATOMIC, MOLECULAR, AND OPTICAL PHYSICS), JUNE 2001, APS THROUGH AIP, USA, vol. 63, no. 6, pages 060301/1-4, XP002233567 ISSN: 1050-2947 abstract</p> <p style="text-align: center;">-----</p>	1,8