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(71) Applicant (for all designated States except US): **THE GENERAL HOSPITAL CORPORATION** [US/US]; 55 Fruit Street, Boston, MA 02114 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **VAKOC, Benjamin, J.** [US/US]; 3 Sargent Street, Cambridge, MA 02140 (US). **YUN, Seok-Hyun** [KR/US]; 30 Cambridge Park Drive, Apt. 4128, Cambridge, MA 02140 (US). **TEARNEY, Guillermo, J.** [US/US]; 118 Kinnaird Street, #3, Cambridge, MA 02139 (US). **BOUMA, Brett, Eugene** [US/US]; 12 Monmouth Street, Quincy, MA 02171 (US).

(74) Agent: **ABELEV, Gary**; Dorsey & Whitney LLP, 250 Park Avenue, New York, NY 10177 (US).

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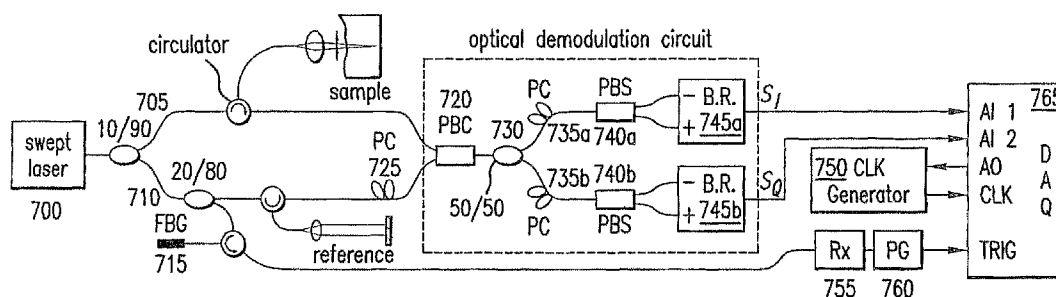
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: APPARATUS, METHODS AND STORAGE MEDIUM FOR PERFORMING POLARIZATION-BASED QUADRATURE DEMODULATION IN OPTICAL COHERENCE TOMOGRAPHY



(57) Abstract: Apparatus, method and storage medium which can provide at least one first electro-magnetic radiation to a sample 130 and at least one second electro-magnetic radiation to a reference, such that the first and/or second electro-magnetic radiations have a spectrum which changes over time. In addition, a first polarization component of at least one third radiation 405 associated with the first radiation can be combined with a second polarization component of at least one fourth radiation 400 associated with the second radiation with one another. The first and second polarizations may be specifically controlled to be at least approximately orthogonal to one another. Apparatus and method are used for quadrature detection of swept source Fourier domain optical coherence tomography.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/031275

A. CLASSIFICATION OF SUBJECT MATTER
INV. G01B9/02 G01N21/47

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)

G01B G01N A61B

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)

EPO-Internal, WPI Data, IBM-TDB, COMPENDEX, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JUN ZHANG, WOONGGYU JUNG, J. STUART NELSON, ZHONGPING CHEN: "Full range polarization-sensitive Fourier domain optical coherence tomography" OPTICS EXPRESS, vol. 12, no. 24, 29 November 2004 (2004-11-29), pages 6033-6039, XP002415697 abstract page 6034, paragraph 2 - page 6037, last paragraph; figures 1,2	1-10, 12-23, 25,26
X	US 6 020 963 A (DIMARZIO CHARLES A [US]) 1 February 2000 (2000-02-01) column 2, line 60 - column 4, line 21; figures 2,2A,2B	1-10, 12-14

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* 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

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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

Petelski, Torsten

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2006/031275

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	YONGHUA ZHAO, ZHONGPING CHEN, ZHIHUA DING, HONGWU REN, J. STUART NELSON: "Real-time phase-resolved functional optical coherence tomography by use of optical Hilbert transformation" OPTICS LETTERS, vol. 27, no. 2, 15 January 2002 (2002-01-15), pages 98-100, XP002415698 abstract page 98, left-hand column, paragraph 1 - page 99, right-hand column, paragraph 2; figure 1	1-10, 12-14
X	----- SIAVASH YAZDANFAR, JOSEPH A. IZATT: "Self-referenced Doppler optical coherence tomography" OPTICS LETTERS, vol. 27, no. 23, 1 December 2002 (2002-12-01), pages 2085-2087, XP002415699 page 2085, left-hand column, paragraph 1 - page 2086, left-hand column, paragraph 3; figure 1	1-10, 12-14
A	----- US 2004/239943 A1 (IZATT JOSEPH A [US] ET AL) 2 December 2004 (2004-12-02) paragraph [0006] - paragraph [0021] -----	1-10, 12-23, 25, 26

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2006/031275

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 11, 24, 27, 28
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 11,24,27,28

Independent claims 27 and 28 contain storage media with software to perform a method of interferometry with the method steps of claims 15 and 26. However, all those method steps like e.g. providing light or combining light are performed by optical arrangements like beamsplitters, detectors or waveplates without the interaction of software. The role and the characteristics of the software are therefore unclear to an extent that no meaningful search can be carried out on claims 27 and 28 (Article 17(2)(a) PCT). Furthermore, it is also unclear, what is meant by "positive" and "negative sections" of a (phase) delay in claims 11 and 24 and therefore also here, no meaningful search is possible.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2006/031275

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6020963	A	01-02-2000	NONE	
US 2004239943	A1	02-12-2004	NONE	