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61/476,211 15 April 2011 (15.04.2011) US(71) Applicant (for all designated States except US): **CARL ZEISS MEDITEC AG** [DE/DE]; Göschwitzer Str. 51 - 52, 07745 Jena (DE).

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Declarations under Rule 4.17:

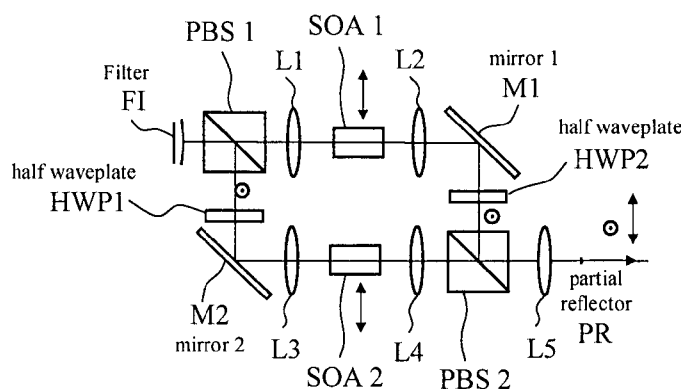
— of inventorship (Rule 4.17(iv))

Published:

— with international search report (Art. 21(3))

(88) Date of publication of the international search report:
21 March 2013

(54) Title: SYSTEMS AND METHODS FOR SWEEPED-SOURCE OPTICAL COHERENCE TOMOGRAPHY

FIG.4

(57) Abstract: Systems and methods for increasing the duty cycle and/or producing interleaved pulses of alternating polarization states in swept-source optical coherence tomography (OCT) systems are considered. Embodiments including improved buffering, frequency selecting filter sharing among multiple SOAs, intracavity switching, and multiple wavelength bands are described. The unique polarization properties of the source configurations have advantages in speckle reduction, polarization-sensitive measurements, polarization state dependent phase shifts, spatial shifts, and temporal shifts in OCT measurements.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/056831

A. CLASSIFICATION OF SUBJECT MATTER
INV. G01B9/02
ADD.

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

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 practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 154 224 A1 (FUJI PHOTO FILM CO LTD [JP]) 14 November 2001 (2001-11-14) paragraph [0019] - paragraph [0048]; figure 1	1-8
X	POTSAID ET AL: "Ultrahigh speed 1050 nm swept source/ Fourier domain OCT retinal and anterior segment imaging at 100,000 to 400,000 axial scans per second", OPTICS EXPRESS, vol. 18, no. 19, 3 September 2010 (2010-09-03), - 3 September 2010 (2010-09-03), pages 20029-20048, XP002683828, cited in the application abstract, page 20034 and figure 1 ----- -/--	1-8



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 application or patent 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

"&" document member of the same patent family

Date of the actual completion of the international search

21 September 2012

Date of mailing of the international search report

04/01/2013

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/056831

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 366 390 B1 (KING JONATHAN [GB] ET AL) 2 April 2002 (2002-04-02) cited in the application column 3, line 50 - column 5, line 26; figure 1 -----	1-8
X	US 2010/245836 A1 (KULKARNI MANISH D [US] ET AL) 30 September 2010 (2010-09-30) paragraph [0021]; figures 1,4 -----	1-8
X	US 2005/213103 A1 (EVERETT MATTHEW J [US] ET AL) 29 September 2005 (2005-09-29) cited in the application paragraph [0023]; figure 4 -----	1-8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2012/056831

Box No. 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.:
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:
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 No. 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:

see additional sheet

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 fees, this Authority did not invite payment of additional fees.
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.:

1-8

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-8

OCT with pulsed light source comprising birefringence compensated delay line using a faraday rotator mirror for increased duty cycle by buffering a pulse, where the wavelength of the light within each pulse varies over time

2. claims: 9-19

OCT with pulsed light source comprising a resonator including two gain mediums located in two parallel branch section, and a single tunable wavelength selective filter, where the wavelength of the light within each pulse varies over time

3. claims: 20-26

OCT with pulsed light source comprising a resonator including two wavelength selective filters located in two branch sections and a switch arranged to couple one of the branches to a common gain medium, where the wavelength of the light within each pulse varies over time

4. claims: 27-32

OCT with pulsed light source where the polarization state of the output pulses alternately switches between two orthogonally related states, where an optical element is located in the sample arm for directing the pulses along one of two paths dependent upon the polarization state of the pulse

5. claims: 33-40

OCT with pulsed light source where the polarization state of the output pulses alternately switches between two orthogonally related states, comprising means for modifying the phase of the pulses having one polarization state with respect to the pulses having the other polarization state

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2012/056831

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
EP 1154224	A1	14-11-2001	EP	1154224 A1		14-11-2001
			US	2001043332 A1		22-11-2001

US 6366390	B1	02-04-2002	NONE			

US 2010245836	A1	30-09-2010	NONE			

US 2005213103	A1	29-09-2005	US	2005213103 A1		29-09-2005
			WO	2005095918 A2		13-10-2005
