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

[Continued on next page]

(54) Title: POLARIZATION SELECTIVE, FREQUENCY SELECTIVE, AND WIDE DYNAMIC RANGE DETECTORS, IMAGING ARRAYS, READOUT INTEGRATED CIRCUITS, AND SENSOR SYSTEMS

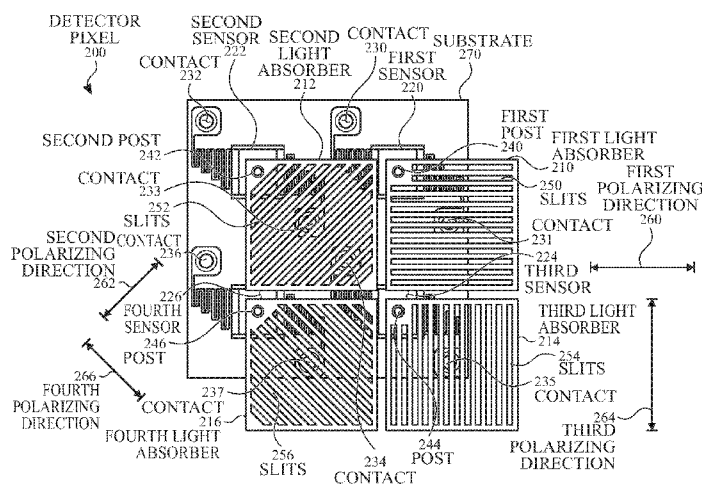


FIG. 2A

(57) Abstract: This relates to sensor systems, detectors, imagers, and readout integrated circuits (ROICs) configured to selectively detect one or more frequencies or polarizations of light, capable of operating with a wide dynamic range, or any combination thereof. In some examples, the detector can include one or more light absorbers; the patterns and/or properties of a light absorber can be configured based on the desired measurement wavelength range and/or polarization direction. In some examples, the detector can comprise a plurality of at least partially overlapping light absorbers for enhanced dynamic range detection. In some examples, the detector can be capable of electrostatic tuning for one or more flux levels by varying the response time or sensitivity to account for various flux levels. In some examples, the ROIC can be capable of dynamically adjusting at least one of the frame rate integrating capacitance, and power of the illumination source.



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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 (Rule 48.2(h))* (88) **Date of publication of the international search report:**
22 September 2016

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/012753

A. CLASSIFICATION OF SUBJECT MATTER INV. G01J5/08 G01J5/02 G01J5/20 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) G01J		
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.
X	W. C. Jones ET AL: "A Polarization Sensitive Bolometric Receiver for Observations of the Cosmic Microwave Background", SPIE Vol. 4855, 1 January 2003 (2003-01-01), pages 227-238, XP055264924, Retrieved from the Internet: URL:http://reviews.spiedigitallibrary.org/data/Conferences/SPIEP/29630/227_1.pdf [retrieved on 2016-04-13]	1-3,5,6, 13-15
Y	abstract, section 2 and 3; figure 2 ----- -/--	4
☒ 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	Date of mailing of the international search report	
22 July 2016	01/08/2016	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Hambach, Dirk	

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2016/012753

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2010/094051 A1 (AIT AUSTRIAN INST TECHNOLOGY [AT]; BRUECKL HUBERT [AT]; MAIER THOMAS []) 26 August 2010 (2010-08-26)	1-3,5,6, 13-15
Y	pages 4-7; claim 1; figures 1-6 -----	4
Y	US 6 410 917 B1 (CHOI KWONG-KIT [US]) 25 June 2002 (2002-06-25) column 11, line 65 - column 12, line 12; figure 6a column 6, line 50 - column 9, line 15; figure 3 -----	4
X	US 2011/266445 A1 (BERATAN HOWARD [US]) 3 November 2011 (2011-11-03) paragraphs [0067] - [0076], [0085] - [0088]; figures 3,5,16 -----	1,11,12, 16
X	US 2014/226021 A1 (KOECHLIN CHARLIE [FR] ET AL) 14 August 2014 (2014-08-14) paragraphs [0065], [0084]; figures 3a,3b -----	1,11,12, 16

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2016/012753

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.:
1-6, 11-16

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 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: 1-6, 13-15

Absorbers coupled to thermal sensors for measuring polarization

2. claims: 7-9, 18

Detection of different wavelengths

3. claim: 10

Four absorbers coupled to single thermal sensor

4. claims: 11, 12, 16

Encapsulation

5. claim: 17

Electrically isolated and thermally coupled absorbers

6. claims: 19, 20

Measuring photocurrent in the absorber itself

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2016/012753

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		EP 2732253 A1 21-05-2014	
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