**Abstract:** A multi energy, such as dual-energy (DE), x-ray imaging system data acquisition and image reconstruction system and method enables optimizing the image contrast of a sample. Using the DE x-ray imaging system and its associated user interface applications, an operator performs a low energy (LE) and high energy (HE) x-ray scan of the same volume of interest of the sample. The system creates a low-energy reconstructed tomographic volume data set from low-energy projections and a high-energy tomographic volume data set from high-energy projections. This enables the operator to control the image contrast of selected slices, and apply the information associated with optimizing the contrast of the selected slice to all slices in the tomographic data sets. This creates a combined volume data set from the LE and HE volume data sets.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
INV. G21K7/00 G01N23/04

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)
G21K G01N

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>Y</td>
<td>section &quot;3. Experimental setup&quot;; figure 5</td>
<td>3, 15, 39, 52</td>
</tr>
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</table>

[X] Further documents are listed in the continuation of Box C. [X] 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) on which the claimed invention cannot be considered to involve an inventive step when the document is taken alone
  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: 6 October 2014

Date of mailing of the international search report: 20/10/2014

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: Oestreich, Sebastian
Box No. I  Nucleotide and/or amino acid sequence(s) (Continuation of item 1.c of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, the international search was carried out on the basis of:
   a. (means)
      - on paper
      - in electronic form
   b. (time)
      - in the international application as filed
      - together with the international application in electronic form
      - subsequently to this Authority for the purpose of search

2. In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments:
INTERNATIONAL SEARCH REPORT

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.:  25, 26, 29-31, 42, 61
   because they relate to subject matter not required to be searched by this Authority, namely:
   see FURTHER INFORMATION sheet PCT/ISA/210

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

3. [x] 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.:
   1-5, 8-10, 12, 13, 15-22, 27, 28, 32-41, 43, 45-47, 49-58, 62

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.
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<td>X</td>
<td>WANG JUN ET AL: &quot;Automated markerless full-field hard X-ray microscopy tomography at sub-50nm 3-dimensional spatial resolution&quot;, APPLIED PHYSICS LETTERS, AMERICAN INSTITUTE OF PHYSICS, US, vol. 100, no. 14, 2 April 2012 (2012-04-02), pages 143107-143107, XP012155508, ISSN: 0003-6951, DOI: 10.1063/1.3701579 [retrieved on 2012-04-04] pages 143107-3, col umns 1-2; figure 1</td>
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<td>Y</td>
<td>D E 100 63 290 AI (ANALOGIC CORP [US]) 6 September 2001 (2001-09-06) col umns 4-5 col umn 6, l ines 22-24</td>
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<td>US 6418189 Bl</td>
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</table>

Form PCT/ISA/210 (patent family annex) (April 2005)
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-5, 8-10, 12, 13, 22, 43, 45-47, 49-51, 58

   Dual energy x-ray tomographic imaging system, in which the sample holder can rotate the sample, with a user interface application that comprises a scout and scan application and a dual energy contrast tuning tool.

   ---

2. claims: 6, 7, 44

   Dual energy x-ray tomographic imaging system, in which the sample holder can rotate the sample, with details on providing dual energy beams for x-ray tomographic imaging system.

   ---

3. claims: 11, 48

   Dual energy x-ray tomographic imaging system, in which the sample holder can rotate the sample, using different timing of exposures of different energies.

   ---

4. claim: 14

   Dual energy x-ray tomographic imaging system, in which the sample holder can rotate the sample, scaling the data sets in intensity.

   ---

5. claims: 15-21, 25-42, 52-57, 61, 62

   User interface and control for a dual energy x-ray tomographic imaging system, in which the sample holder can rotate the sample.

   ---

6. claims: 23, 24, 59, 60

   Determination of molar concentration
Continuation of Box III.1

Claims Nos.: 25, 26, 29-31, 42, 61

The claims 25, 26, 29-31, 42, 61 relate exclusively to a device for displaying information, defined solely by the way the information is displayed. No technical details relating to obtaining or processing of the information is present in the claims, and thus the claims are excluded from the search (Rule 39.1(v) PCT).