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61/179,762 20 May 2009 (20.05.2009) US(71) Applicant (for all designated States except US): **MAPPER LITHOGRAPHY IP B.V.** [NL/NL]; Computerlaan 15, NL-2628XK Delft (NL).

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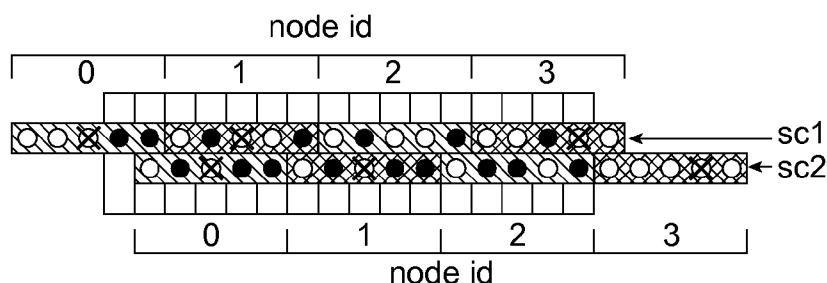
Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

Published:

— with international search report (Art. 21(3))
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13 January 2011

(54) Title: DUAL PASS SCANNING

**Fig. 15**

(57) Abstract: A method for exposing a wafer using a plurality of charged particle beamlets. The method comprises identifying non-functional beamlets among the beamlets, allocating a first subset of the beamlets for exposing a first portion of the wafer, the first subset excluding the identified non-functional beamlets, performing a first scan for exposing the first portion of the wafer using the first subset of the beamlets, allocating a second subset of the beamlets for exposing a second portion of the wafer, the second subset also excluding the identified non-functional beamlets, and performing a second scan for exposing the second portion of the wafer using the second subset of the beamlets, wherein the first and second portions of the wafer do not overlap and together comprise the complete area of the wafer to be exposed.

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2010/052217

A. CLASSIFICATION OF SUBJECT MATTER

INV. H01J37/317

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)

H01J G03F H01L

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 523 027 A (HITACHI HIGH TECH CORP [JP]; CANON KK [JP]) 13 April 2005 (2005-04-13) paragraph [0051] - paragraph [0064] figures 4,5	1-21
X	WO 2007/013802 A (MAPPER LITHOGRAPHY IP BV [NL]; STEENBRINK STIJN WILLEM HERMAN [NL]; KR) 1 February 2007 (2007-02-01) the whole document	1-21
X	US 4 467 211 A (SMITH DONALD O [US] ET AL) 21 August 1984 (1984-08-21) column 13, line 5 - column 21, line 18 figures 6,8-11	1
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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.

"&" document member of the same patent family

Date of the actual completion of the international search

6 September 2010

Date of mailing of the international search report

05/11/2010

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 05 275322 A (FUJITSU LTD [JP]) 22 October 1993 (1993-10-22) abstract figures	1
X,P	----- "Multi-tone rasterization, dual pass scan, data path and cell based vector format" IP.COM JOURNAL, IP.COM INC., WEST, HENRIETTA, NY, US, 22 May 2009 (2009-05-22), XP013131917 ISSN: 1533-0001 page 46, paragraph B1 - page 48, paragraph B25 page 1 - page 41 figures	1-21
A	----- WO 01/35165 A1 (ION DIAGNOSTICS INC [US]) 17 May 2001 (2001-05-17) page 5, line 8 - line 23 page 7, line 23 - page 9, line 7 page 29, line 13 - line 26 figures 1, 2, 9 -----	1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2010/052217

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.:

1-21

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: 1-21

Closest prior art (EP1523027): multiple charged particle beam lithography exposure method in which the non-functional (failing) beamlets are identified; a first subset of valid beamlets are allocated for exposing a first portion of the wafer and a second subset of valid beamlets are allocated for exposing a second portion of the wafer.

Special technical feature, taking due account of the description and drawings: particular type of preparation of the beamlet control data.

Technical effect of this special technical feature: enabling parallel processing.

Problem solved by this special technical feature: increased throughput.

2. claims: 22-26

Closest prior art (WO 01/35165): multiple electron beam charged particle lithography system comprising an electron beam column with a blanking array, a data path controlling the blanker array and a wafer positioning system.

Special technical feature, taking due account of the description and drawings: data path comprising a plurality of channels connected to the blanker and a processing unit being switched between different channels.

Technical effect of this special technical feature: reduction of number of processing units.

Problem solved by this special technical feature: simplification of the system.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2010/052217

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