Abstract: The problem of mura in large area photomasks is solved or at least reduced by setting up a writing system to write a pattern with high accuracy and with the optical axes essentially parallel to the movement axes of the stage, then writing photomasks in two passes with the substrate rotated to different angles on the stage. The angle between the orientation of the first and second pass is larger than about 10 degrees, larger than about 20 degrees or larger than about 35 degrees and it can be approximately 10 degrees, approximately 50 degrees, approximately 60 degrees or approximately 90 degrees. The substrate is physically rotated on the stage and aligned with high accuracy after the rotation and the data driving the first and second exposure passes are derived from the first input data specification but processed according to the known oblique angles, so that the second pass is accurately overlaid on the first pass.
**A. CLASSIFICATION OF SUBJECT MATTER**

INV. G03F9/00  G03F7/20  G03F1/42

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)

G03F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
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<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>US 2012/307219 A1 (SANDSTROM TORBJORNEN) [SE] SANDSTROM TORBJORN [SE]) 6 December 2012 (2012-12-06) paragraphs [0002] - [0009], [0020], [0022], [0054]; claims 1-11; figures 1-8</td>
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<td>US 2008/032066 A1 (STIBLERT LARS [SE] ET AL) 7 February 2008 (2008-02-07) paragraphs [2866], [0294], [0390], [0396], [0435], [0438]; figures 56,94,95</td>
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<td>WO 2005/029178 A2 (ORBOTECH LTD [IL]; GROSS ABRAHAM [IL]; ADIN RAANAN [IL]; KATZIR YIGAL) 31 March 2005 (2005-03-31) figures 1-3</td>
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  - "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

**Date of the actual completion of the international search**

16 September 2014

**Date of mailing of the international search report**

27/10/2014

**Name and mailing address of the ISA/Authorized officer**

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