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(71) Applicant: **KLA-TENCOR CORPORATION** [US/US];
Legal Dept., One Technology Drive, Milpitas, California
95035 (US).

(72) Inventors: **BHATTACHARYYA, Santosh**; 5540 Cooney
Place, San Jose, California 95123 (US). **SHARMA,
Devashish**; 750 N. King Road, Apt. #609, San Jose, Cal-
ifornia 95133 (US). **MAHER, Christopher**; 407 Lawn-
dale Avenue, Campbell, California 95008 (US). **HUA, Bo**;
Room 202-1, No.17, Lane 1047 Tang'an Road, Pudong

New Area, Shanghai (CN). **MEASOR, Phillip**; 1242 Min-
nesota Avenue, San Jose, California 95125 (US). **DANEN,
Robert**; 787 Sylvaner Drive, Pleasanton, California 94566
(US).

(74) Agent: **MCANDREWS, Kevin** et al.; KLA-Tencor Corp.,
Legal Dept., One Technology Drive, Milpitas, California
95035 (US).

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(54) Title: DEFECT DISCOVERY AND RECIPE OPTIMIZATION FOR INSPECTION OF THREE-DIMENSIONAL SEMICON-
DUCTOR STRUCTURES

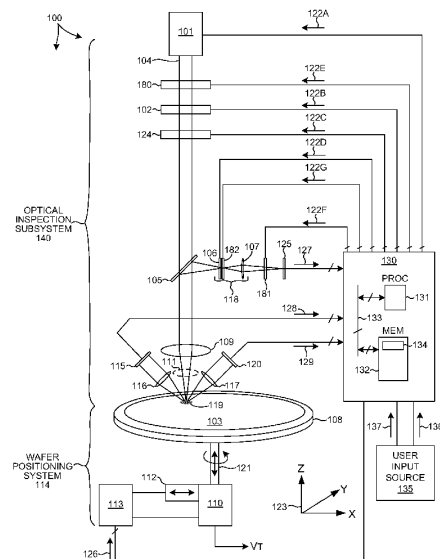


FIG. 2

(57) Abstract: Methods and systems for discovery of defects of interest (DOI) buried within three dimensional semiconductor structures and recipe optimization are described herein. The volume of a semiconductor wafer subject to defect discovery and verification is reduced by storing images associated with a subset of the total depth of the semiconductor structures under measurement. Image patches associated with defect locations at one or more focus planes or focus ranges are recorded. The number of optical modes under consideration is reduced based on any of a comparison of one or more measured wafer level defect signatures and one or more expected wafer level defect signatures, measured defect signal to noise ratio, and defects verified without de-processing. Furthermore, verified defects and recorded images are employed to train a nuisance filter and optimize the measurement recipe. The trained nuisance filter is applied to defect images to select the optimal optical mode for production.

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