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(54) Title: SINGLE CELL GREY SCATTEROMETRY OVERLAY TARGETS AND THEIR MEASUREMENT USING VARYING ILLUMINATION PARAMETER(S)

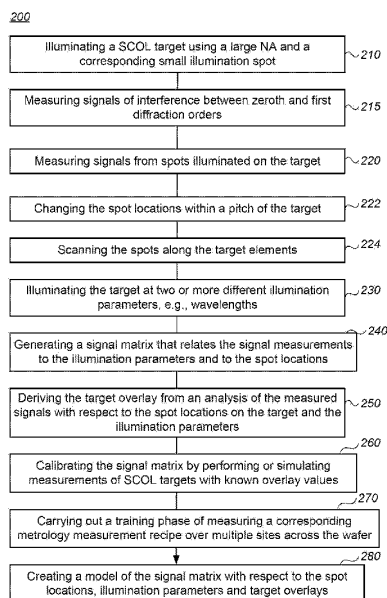


Figure 3

(57) Abstract: Scatterometry overlay (SCOL) measurement methods, systems and targets are provided to enable efficient SCOL metrology with in-die targets. Methods comprise generating a signal matrix by: illuminating a SCOL target at multiple values of at least one illumination parameter, and at multiple spot locations on the target, wherein the illumination is at a NA (numerical aperture) $> 1/3$ yielding a spot diameter $< 1\mu$, measuring interference signals of zeroth and first diffraction orders, and constructing the signal matrix from the measured signals with respect to the illumination parameters and the spot locations on the target; and deriving a target overlay by analyzing the signal matrix. The SCOL targets may be reduced to be a tenth in size with respect to prior art targets, as less and smaller target cells are required, and be easily set in-die to improve the accuracy and fidelity of the metrology measurements.

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