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(54) **Title:** IMAGING OVERLAY WITH MUTUALLY COHERENT OBLIQUE ILLUMINATION

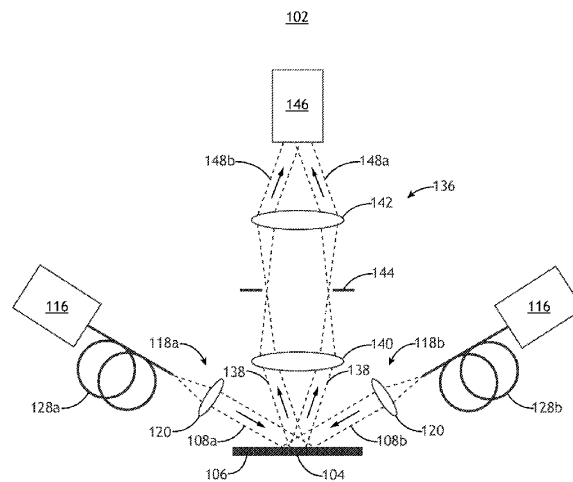


FIG. 1B

(57) **Abstract:** An overlay metrology system may include illumination sources configured to generate one or more pairs of mutually coherent illumination beams and illumination optics to direct the pairs of illumination beams to an overlay target at common altitude incidence angles and symmetrically opposed azimuthal incidence angles, where the overlay target includes two or more grating structures distributed along one or more measurement directions. The system may further include imaging optics to image the overlay target onto detectors when implementing the metrology recipe, where an image of a particular one of the two or more grating structures is generated exclusively with a single non-zero diffraction order of light from each of the illumination beams within the particular one of the pairs of illumination beams. The system may further include a controller to determine overlay measurements based on images of the overlay target.

[Continued on next page]

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