Calibration and Evaluation of Conoscope Images

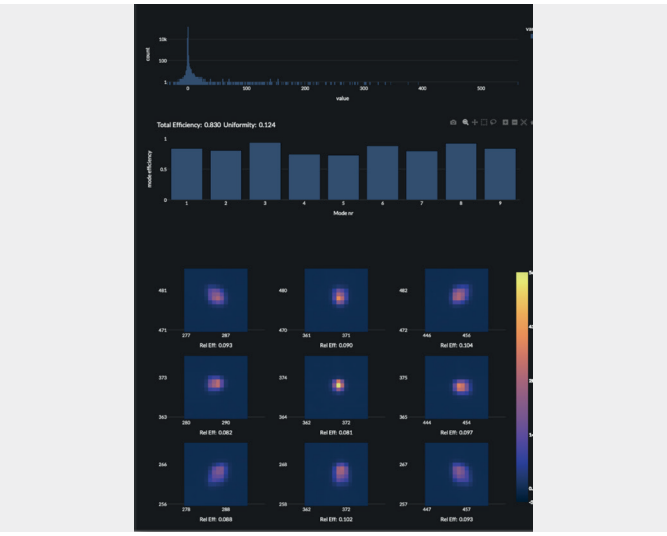

Abb. 1: Metrify showing the results of a fanout evaluation

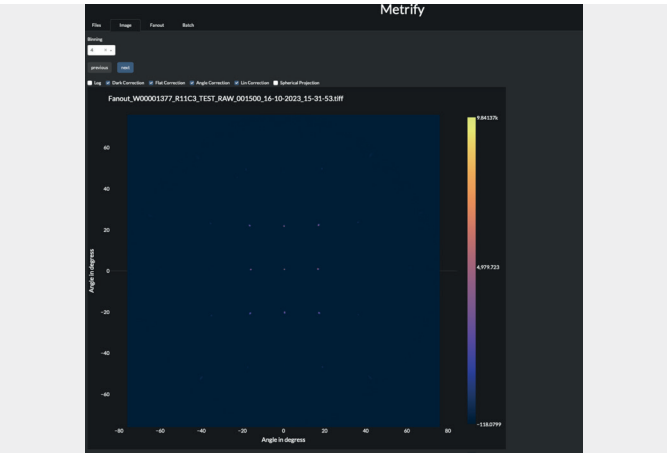

Abb. 2: Metrify showing the corrected conoscope image of a fanout optical element

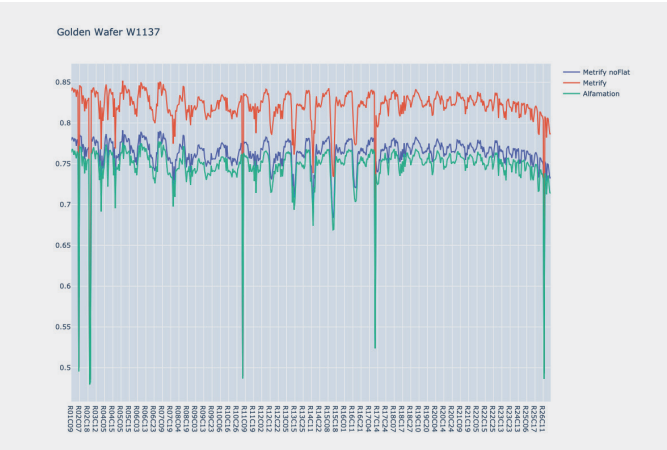

Abb. 3: Results

Task
NIL Technologies Switzerland GmbH (NILT) uses mass production testers from the Manufacturer Alfamation. This test system is used to inspect wafer level optical elements. In addition to the measurement results, the tester can store raw unprocessed image from the conoscope for debugging purposes.

To simplify the testing of new optical elements and different approaches in evaluation of such, NILT would like a processing toolchain for conoscope images independent of the tester. This allows NILT gather first results of new elements or insights for possible improvement in existing algorithms without the dependance, cost and time necessary if the manufacturer of the test system had to be involved.

Concept
This work describes the implementation of a toolchain to process conoscope images from an optical mass production test system for wafer level optical elements.

The raw images from the test system are parsed for attributes, different corrections are being applied to create a corrected image.

The corrected image is then further used to extract the metrics of a diffractive fanout element. This element splits a collimated laser beam into 9 beams at different angle. The spots are localized in the corrected image and their intensity measured to extract the performance metrics required by NILT.

Implementation
A Web Application named Metrify has been created with the python programming language utilizing the dash framework to process images of the type fanout and extract the metrics the customer requires.

Results
The evaluation results of the toolchain have been compared with the results of the manufactures implementation using of a variable optical attenuator as a reference.

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