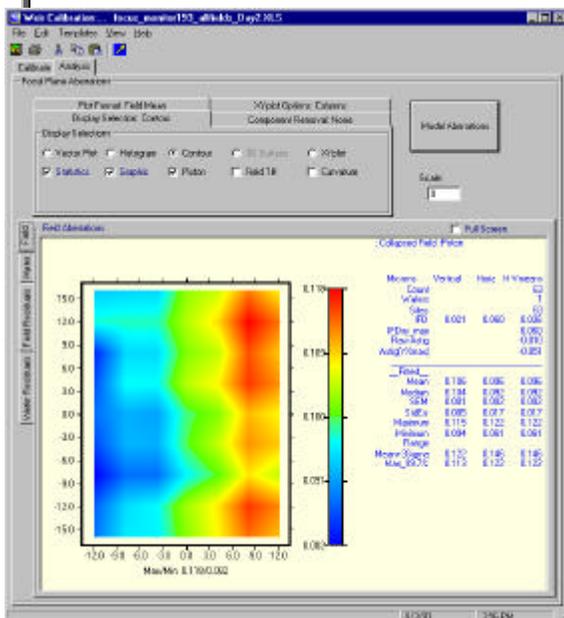# Weir PSFM Applications

The Weir Wavefront Engineering Software supports automated analysis of these and other applications

Application	Weir Segment	Method	Comment
Raw Data Visualization	Raw Data screen	Statistics, modeling and graphic displays of data as originally imported	Can be used without calibration. Provides a quick & easy visualization of data sets.
Setup Evaluation	Calibration Screen	Examine calibration statistics with vector plots of coefficients of a focus matrix calibration	Weir utilities assist in determination of the proper dose and focus range of the current experiment. Other utilities confirm processing and metrology quality.
Lens Characterization	Best Focus screen	Focus/dose arrays are modeled for each point in field. Best Focus is derived from modeled results.	The most accurate, process independent method of assessing a the optimum performance of an optical system. Process can be applied to any combination of NA/PC settings. Analysis variation is subject only to variations in reticle chucking.
Reticle Chucking on the exposure tool platen	Best Focus Screen	Expose several wafers with the same focus matrix on the same exposure tool. Re-load the reticle before each reticle exposure. Measure all wafers as a single lot & analyze separately.	Reticles can be tilted or even bowed as the reticle chuck wears over time. Changes in tlt, curvature and depth-of-focus or Intra-Field-Deviation will indicate the level of reticle warp induced by the exposure tool.
Tilt Analysis	Best Focus Screen	Focus matrix exposure will be analyzed.	The modal Field Tilt will be reported in the statistics. For scanners, the tilt for each row and column is also recorded in the Best Focus tab of the spreadsheet. Evaluating row and column individual tilts provide a measure of the reticle-to-wafer tilt (slit direction) as well as the scanning stage tilt (scan direction).

TEA Systems

Weir Software Applications

Application	Weir Segment	Method	Comment
Lens Depth-of-Focus	Best Focus Screen	Focus Matrix exposure on Best Focus screen.	Examine the Intra-Field-Deviation (IFD) statistic for the lens. For most critical results examine the statistic using the MinMax value setting.
Process Depth-of-Focus	Analysis Screen	Fixed focus exposure of fields across one or more wafers. Remove the "Best Focus" field before modeling the focus data.	Evaluate the increase in IFD contributed by the auto-focus system and wafer auto-leveling. Monitor and specify the stage and/or scan direction for maximum descrimination on both steppers and scanners.
Lens Astigmatism	Best Focus Screen	Examine focus/dose matrix results for various NA and PC settings of the lens.	Astigmatism is reported in the statistics.
Scan Noise	Best Focus Screen	Examine calibration of focus matrix.	Examine statistics and modeling for each of the individual rows or columns. For a vertical scan system, such as the ASML scanner, the columns will yield scanning stage noise. Examine the rows for horizontal scan noise evaluation.
Auto-Focus Stability	Analysis Screen	Expose one or more wafers with constant focus. Mark layout with scan or stage direction.	Examine both tilt and modeled focus for each field. Results may be plotted or viewed on the stored worksheet.
Wafer Leveling	Analysis Screen	Expose one or more wafers with constant focus.	Display data points as either the mean field or MinMax field value for each grid point. Leveling variation across the wafer will yield uniformity information
Scan Direction Sensitivity	Analysis Screen	Expose one or more wafers with constant focus. Mark layout with scan or stage direction.	
Wafer Flatness	Analysis Screen	Expose one or more wafers with constant focus.	Display data points as the mean field for each grid point. Examination of the modeled focus variation across the wafer will yield flatness information information