CLAIMS

1. A method comprising:

deriving an at least partially continuous dependency of at least one metrology metric on at least one recipe parameter, by simulation or in preparatory measurements;

analyzing the derived dependency;

determining a metrology recipe according to the analysis; and,

conducting at least one metrology measurement according to the determined recipe, wherein the at least one metrology measurement comprises an overlay metrology measurement of a grating-over-grating scatterometry target or a side-by-side scatterometry target and the at least one recipe parameter is related to an optical path difference between the gratings and comprises at least one of: a thickness of intermediate layers between the gratings, a measurement wavelength, an angle of incidence, an angle of reflectance, polarization properties of incident and reflected light, target geometric parameters or electromagnetic characteristics of the gratings and of the intermediate layers between the gratings.

2. The method recited in Claim 1, wherein the analysis comprises identifying at least one extremum in the at least partially continuous dependency.

3. The method recited in Claim 1, further comprising determining the metrology recipe analytically by nullifying a derivative of the at least partially continuous dependency.

4. The method recited in Claim 1, wherein the deriving is carried out on the fly.

5. The method recited in Claim 1, further comprising distinguishing asymmetric process variation from symmetric process variation by simulating or measuring an effect thereof on the derived dependency.

6. The method recited in Claim 1, further comprising using an overlay variation measure as the at least one metrology metric.

7. The method recited in Claim 1, further comprising calculating the at least one metrology metric according to at least one weight function applied to a plurality of pupil pixels that are measured in the at least one metrology measurement, to achieve low inaccuracy, wherein the at least one weight function is determined with respect to the at least partially continuous dependency.

8. The method recited in Claim 7, wherein the at least one weight function is further determined with respect to a relation between an expected signal directionality and a given illumination directionality.

9. The method recited in Claim 1, further comprising identifying resonances in an intermediate film stack between target structures according to the at least partially continuous dependency.

10. The method recited in Claim 1, further comprising estimating a per-pixel signal contamination by comparing estimation and measurement data of the at least one metrology metric.

11. The method recited in Claim 1, wherein the at least partially continuous dependency is a sensitivity landscape of the at least one metrology metric with respect to the at least one recipe parameter.

12. The method recited in Claim 11, further comprising identifying points or contours of zero sensitivity in the sensitivity landscape and conducting the at least one metrology measurement at a region around the points or contours of zero sensitivity with respect to a set of parameters.

13. The method recited in Claim 12, further comprising using single or multiple scattering models to identify the points or contours of zero sensitivity in the landscape.

14. The method recited in Claim 12, further comprising binning signals from portions of a subspace spanned by the set of parameters.

15. The method recited in Claim 12, further comprising binning signals from portions of the pupil according to the identified points or contours of zero sensitivity in the landscape.

16. The method recited in Claim 12, further comprising selecting an illumination spectral distribution according to the identified points or contours of zero sensitivity in the landscape.

17. The method recited in Claim 1, wherein the at least partially continuous dependency is a landscape of the at least one metrology metric with respect to the at least one recipe parameter.

18. The method recited in Claim 17, further comprising characterizing the landscape by distinguishing flat regions from peaks.

19. The method recited in Claim 18, further comprising using relative signs of slopes of the landscape at consecutive peaks to determine whether a respective intermediate flat region between the consecutive peaks is an accurate flat region.

20. The method recited in Claim 18, further comprising determining a required sampling density for different regions of the landscape according to peak locations in the landscape.

21. The method recited in Claim 18, further comprising sampling the landscape at a high density at peak regions and at a low density at flat regions.

22. The method recited in Claim 18, further comprising measuring a symmetric process robustness using relative sizes of peak regions and flat regions.

23. The method recited in Claim 18, further comprising identifying the peaks according to a number of sign flips of the at least one metrology metric.

24. The method recited in Claim 23, further comprising characterizing the identified peaks according to the number of sign flips of the at least one metrology metric as simple or complex peaks.

25. The method recited in Claim 18, further comprising integrating the at least one metrology metric over at least one specified landscape region.

26. The method recited in Claim 25, wherein the at least one metrology metric comprises at least an overlay.

27. The method recited in Claim 18, wherein the at least one metrology metric comprises at least two metrology metrics, and further comprising correlating the at least two metrology metrics over specified landscape regions to validate the at least one metrology measurement.

28. The method recited in Claim 1, further comprising interpolating or extrapolating a continuous artificial signal landscape from discrete measurements or data of the at least partially continuous dependency.

29. The method recited in Claim 28, further comprising constructing the continuous artificial signal landscape by fitting the discrete measurements or data to an underlying physical model.

30. The method recited in Claim 28, further comprising applying at least one cost function to the artificial signal landscape for calculating a respective at least one metrology metric.

31. The method recited in Claim 17, further comprising deriving the landscape as a parametric landscape with respect to at least one parameter.

32. The method recited in Claim 31, further comprising adjusting the at least one parameter to optimize the parametric landscape with respect to specified metrics.

33. The method recited in Claim 32, wherein the adjusting is carried out to enhance an accuracy of an overlay measurement.

34. The method recited in Claim 32, wherein the adjusting is carried out with respect to a phenomenological model.

35. The method recited in Claim 31, wherein the deriving is carried out with respect to a plurality of measurements.

36. The method recited in Claim 17, further comprising quantifying landscape shifts caused by symmetric process variation.

37. The method recited in Claim 36, further comprising selecting measurement settings according to the quantified landscape shifts.

38. The method recited in Claim 36, further comprising selecting measurement settings to exhibit low sensitivity to the quantified landscape shifts.

39. The method recited in Claim 36, further comprising cancelling out the quantified landscape shifts by corresponding target or measurement designs which cause an opposite shift of the landscape.

40. The method recited in Claim 36, further comprising fitting measurement parameters to different target sites according to the quantified landscape shifts in the respective sites.

41. The method recited in Claim 36, further comprising selecting an illumination spectral distribution according to the quantified landscape shifts.

42. The method recited in Claim 15, further comprising optimizing at least one of a metrology recipe and hardware settings to achieve low inaccuracy according to the landscape.

43. The method recited in Claim 42, further comprising tuning at least one hardware parameter to points or contours of zero sensitivity in the landscape.

44. The method recited in Claim 17, further comprising designing metrology targets to yield low inaccuracy according to the landscape.

45. The method recited in Claim 44, further comprising predicting resonances in an intermediate film stack between target structures according to the landscape and configuring the intermediate film stack to yield resonances at specified measurement parameters.

46. The method recited in Claim 45, further comprising minimizing electromagnetic penetration below or at a target's lower structure.

47. The method recited in Claim 46, further comprising designing the targets to have dummy-fill or segmentation at or below their lower layer.

48. The method recited in Claim 44, further comprising performing metrology measurements of the designed targets.

49. The method recited in Claim 48, wherein the landscape is a sensitivity landscape and further comprising measuring overlay at low or zero inaccuracy points or contours of the sensitivity landscape.

50. The method recited in Claim 44, further comprising performing metrology measurements at flat regions of the landscape.

51. A target design file designed according to the method recited in Claim 44.

52. The landscape determined by the method recited in Claim 11.