Claims

1. A method comprising: deriving, from parameters of process-related line edge roughness (LER), an estimation of minimal dimensions of target elements required to comply with given measurement uncertainty specifications, designing a metrology target to have target design parameters conforming with the estimation of minimal dimensions, estimating a range of variation of at least one stochastic parameters characterizing the process-related LER, deriving, analytically or using simulation, an error resulting from estimating the range of variation according to a given measurement model for the metrology metric values, using the error resulting from estimating the range of variation to estimate uncertainty error of overlay measurements of the metrology target, wherein the uncertainty error is due to the process-related LER, estimating the uncertainty error for multiple measurement models based on a single target uncertainty, and selecting one of the measurement models with the uncertainty error complying with a required specification, wherein at least one of the deriving or the designing is carried out by at least one computer processor.

2. The method of claim 1, wherein the metrology target has a periodic structure characterized by the target design parameters.

3. A computer program product comprising a non-transitory computer readable storage medium having computer readable program embodied therewith, the computer readable program configured to carry out the method of claim 1.

4. A metrology module comprising the computer program product of claim 3.

5. A segmented overlay target, having periodic and segmented structures, with segmentation parameters conforming with the estimation of minimal dimensions derived by the method of claim 1.

6. A method comprising: estimating a line edge roughness (LER)-related uncertainty error of critical dimension scanning electron microscopy (CDSEM) metrology metric values derived by scanning electron microscope (SEM) from a critical dimension scanning electron microscopy (CDSEM) target, by: estimating a range of variation of at least one stochastic parameter characterizing the LER, deriving, analytically and/or using simulation, an error resulting from estimating the range of variation according to a given measurement model for the metrology metric values, using the error resulting from estimating the range of variation to estimate the LER-related uncertainty error, estimating the LER-related uncertainty error for multiple measurement models based on a single target uncertainty, and selecting one of the measurement models with the LER-related uncertainty error complying with a required specification, wherein at least one of the estimating, the deriving, or the using is carried out by at least one computer processor.

7. The method of claim 6, wherein the multiple measurement models comprise wafer models, wafer and field models and/or field models.

8. The method of claim 7, wherein the multiple measurement models comprise at least highest order (HO) and correctables per exposure (CPE) models.

9. The method of claim 6, further comprising determining a model complexity of a corresponding measurement model with respect to the error resulting from estimating the range of variation.

10. A computer program product comprising a non-transitory computer readable storage medium having computer readable program embodied therewith, the computer readable program configured to carry out the method of claim 6.

11. A metrology module comprising the computer program product of claim 10.

12. A method comprising: estimating an uncertainty error of optical metrology metric values due to line edge roughness (LER) by: estimating a range of variation of at least one stochastic parameters characterizing the LER, deriving, analytically or using simulation, an error resulting from estimating the range of variation according to a given measurement model for the metrology metric values, using the error resulting from estimating the range of variation to estimate the uncertainty error, estimating the uncertainty error for multiple measurement models based on a single target uncertainty, and selecting one of the measurement models with the uncertainty error complying with a required specification, wherein at least one of the estimating, the deriving, or the using is carried out by at least one computer processor.

13. The method of claim 12, wherein the multiple measurement models comprise wafer models, wafer and field models and/or field models.

14. The method of claim 13, wherein the multiple measurement models comprise at least highest order (HO) and correctables per exposure (CPE) models.

15. The method of claim 12, further comprising determining an optimal model complexity of a corresponding measurement model with respect to the uncertainty error and the required specification.

16. A computer program product comprising a non-transitory computer readable storage medium having computer readable program embodied therewith, the computer readable program configured to carry out the method of claim 14.

17. A metrology module comprising the computer program product of claim 16.

18. A method comprising: determining an impact of stochastic noise on a given overlay metrology data set, derived from applying a specified metrology model, by: generating a plurality of noise realizations of random synthetic noise, adding the plurality of noise realizations to the given overlay metrology data set to yield a modified data set, and using at least one metrology metric, comparing metric values for the given overlay metrology data set and for the modified data set, wherein the comparison provides an estimated noise impact on the given overlay metrology data set, and wherein at least one of the generating, the adding, or the comparing is carried out by at least one computer processor.

19. The method of claim 18, wherein the generation of the plurality of noise realizations is carried out using measured metrology results.

20. The method of claim 18, further comprising estimating the noise impact on the specified metrology model by estimating the noise impact on an uncertainty of multiple given overlay metrology data sets derived by applying the specified metrology model.

21. The method of claim 18, further comprising optimizing a type of the specified metrology model by comparing the noise impact on the specified metrology model to a required uncertainty specification.

22. The method of claim 21, further comprising deriving an analytic expression for a dependency of the estimated noise impact on model parameters.

23. The method of claim 22, wherein the model parameters comprise at least a sample size and a resulting uncertainty specification for the specified metrology model.

24. The method of claim 18, wherein the stochastic noise comprises line edge roughness (LER) properties.

25. The method of claim 23, further comprising detecting line edge positions of target elements.

26. The method of claim 23, further comprising analyzing, statistically, the impact of the LER on edge detection results.

27. A computer program product comprising a non-transitory computer readable storage medium having computer readable program embodied therewith, the computer readable program configured to carry out the method of claim 18.

28. A metrology module comprising the computer program product of claim 27.