What is claimed is:

1. A computer-implemented method for detecting defects on a wafer, comprising:

generating one or more test images for at least a portion of an array region in one or more dies on a wafer from one or more of frame images generated by scanning the wafer with an inspection system;

generating a reference image for one or more cells in the array region from two or more of the frame images generated by said scanning the wafer with the inspection system;

determining one or more difference images for at least one cell in at least the portion of the array region in the one or more dies by subtracting the reference image from one or more portions of the one or more test images corresponding to the at least one cell; and

detecting defects on the wafer in the at least one cell based on the one or more difference images determined for the at least one cell, wherein said generating the one or more test images, generating the reference image, determining the one or more difference images, and detecting the defects are performed with a computer system.

2. The method of claim 1, wherein generating the one or more test images comprises determining a robust average image from two or more of the frame images.

3. The method of claim 2, wherein generating the reference image comprises determining a median cell image from the robust average image.

4. The method of claim 1, wherein generating the one or more test images comprises determining the one or more test images from two or more of the frame images, and wherein the method further comprises aligning the two or more frame images to each other prior to generating the one or more test images.

5. The method of claim 1, wherein each of the one or more test images is generated from only one of the one or more of the frame images.

6. The method of claim 5, wherein generating the reference image comprises determining a median cell image from at least one of the one or more of the frame images.

7. The method of claim 5, wherein determining the one or more difference images is further performed by subtracting the reference image from the one or more portions of said each of the one or more test images.

8. The method of claim 1, wherein detecting the defects comprises determining an additional difference image from two or more of the difference images and detecting the defects based on the additional difference image.

9. The method of claim 8, wherein determining the additional difference image comprises determining a robust average image from the two or more difference images.

10. The method of claim 8, wherein determining the additional difference image comprises aligning the two or more difference images to each other and determining the additional difference image based on the aligned two or more difference images.

11. The method if claim 1, wherein generating the reference image for the one or more cells in the array region from the two or more of the frame images is performed such that portions of the two or more of the frame images corresponding to defects on the wafer are altered.

12. The method of claim 1, wherein the defects that are detected comprise defects that repeat in different cells at substantially the same within die location in two or more of the dies on the wafer.

13. The method of claim 1, wherein generating the one or more test images is performed such that differences between portions of the one or more test images corresponding to defects and portions of the one or more test images corresponding to noise are greater than the differences in the one or more frame images.

14. The method of claim 1, further comprising identifying one or more of the at least one cell in which the defects are located based on the one or more of the frame images.

15. The method of claim 1, wherein the detected defects are potential defects on the wafer, the method further comprising determining a defect attribute for each of the potential defects and determining which of the at least one cell contains actual repeating defects based on the determined defect attributes corresponding to the at least one cell.

16. The method of claim 1, wherein the one or more of the frame images used to generate the one or more test images and the two or more of the frame images used to generate the reference image are acquired in the same scan of the wafer performed during said scanning.

17. The method of claim 1, wherein at least one of the one or more of the frame images used to generate the one or more test images and at least one of the two or more of the frame images used to generate the reference image are acquired in the same scan of a single die on the wafer.

18. A non-transitory computer-readable medium, storing program instructions executable on a computer system for performing a computer-implemented method for detecting defects on a wafer, wherein the computer-implemented method comprises:

generating one or more test images for at least a portion of an array region in one or more dies on a wafer from one or more of frame images generated by scanning the wafer with an inspection system;

generating a reference image for one or more cells in the array region from two or more of the frame images generated by said scanning the wafer with the inspection system;

determining one or more difference images for at least one cell in at least the portion of the array region in the one or more dies by subtracting the reference image from one or more portions of the one or more test images corresponding to the at least one cell; and

detecting defects on the wafer in the at least one cell based on the one or more difference images determined for the at least one cell.

19. A system configured to detect defects on a wafer, comprising:

an inspection subsystem configured to scan a wafer to thereby generate frame images for the wafer, wherein the inspection subsystem comprises at least a light source and one or more detectors, wherein the inspection subsystem is further configured to direct light from the light source to the wafer, and wherein light from the wafer is collected and detected by the one or more detectors of the inspection subsystem during scanning to thereby generate the frame images; and

a computer subsystem configured for:

generating one or more test images for at least a portion of an array region in one or more dies on the wafer from one or more of the frame images;

generating a reference image for one or more cells in the array region from two or more of the frame images;

determining one or more difference images for at least one cell in at least the portion of the array region in the one or more dies by subtracting the reference image from one or more portions of the one or more test images corresponding to the at least one cell; and

detecting defects on the wafer in the at least one cell based on the one or more difference images determined for the at least one cell.

20. The system of claim **19**, wherein generating the one or more test images comprises determining a robust average image from two or more of the frame images.

21. The system of claim **20**, wherein generating the reference image comprises determining a median cell image from the robust average image.

22. The system of claim **19**, wherein generating the one or more test images comprises determining the one or more test images from two or more of the frame images, and wherein the computer subsystem is further configured for aligning the two or more frame images to each other prior to generating the one or more test images.

23. The system of claim **19**, wherein each of the one or more test images is generated from only one of the one or more of the frame images.

24. The system of claim **23**, wherein generating the reference image comprises determining a median cell image from the two or more of the frame images.

25. The system of claim **23**, wherein determining the one or more difference images is further performed by subtracting the reference image from the one or more portions of said each of the one or more test images.

26. The system of claim 19, wherein detecting the defects comprises determining an additional difference image from two or more of the difference images and detecting the defects based on the additional difference image.

27. The system of claim 26, wherein determining the additional difference image comprises determining a robust average image from the two or more difference images.

28. The system of claim 26, wherein determining the additional difference image comprises aligning the two or more difference images to each other and determining the additional difference image based on the aligned two or more difference images.

29. The system of claim 19, wherein generating the reference image for the one or more cells in the array region from the two or more of the frame images is performed such that portions of too or more of the frame images corresponding to defects on the wafer are altered.

30. The system of claim 19, wherein generating the one or more test images is performed such that differences between portions of the one or more test images corresponding to defects and portions of the one or more test images corresponding to noise are greater than the differences in the one or more of the frame images.

31. The system of claim 19, wherein the computer subsystem is further configured for identifying one or more of the at least one cell in which the defects are located based on the one or more of the frame images.

32. The system of claim 19, wherein the computer subsystem is further configured for determining a defect attribute for each of the detected defects and determining which of the at least one cell contains actual repeating defects based on the determined defect attributes corresponding to the at least one cell.

33. The system of claim 19, wherein the one or more of the frame images used to generate the one or more test images and the two or more of the frame images used to generate the reference image are acquired in the same scan of the wafer performed by the inspection subsystem.

34. The system of claim 19, wherein at least one of the one or more of the frame images used to generate the one or more test images and at least one of the two or more of the frame images used to generate the reference image are acquired in the same scan of a single die on the wafer.