

Improve 3D X-ray image quality and increase scan speed by 2X

for semiconductor packages

ZEISS OptiRecon

The new ZEISS OptiRecon option for ZEISS Xradia Versa X-ray microscopes (XRM) and Xradia Context microCT enables significantly faster 3D X-ray image acquisition at any energy setting through an image reconstruction algorithm known as iterative reconstruction. In addition to speeding up analysis, OptiRecon also can provide better image quality at standard scan speeds. It is well-suited for failure analysis (FA) and development applications across a wide variety of semiconductor packages.

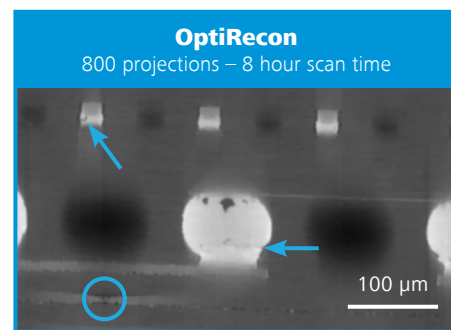
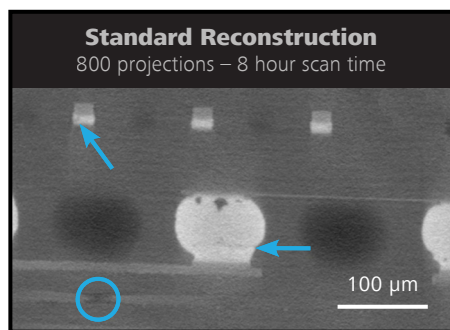
Up to 2X Faster Scans at Similar Image Quality

OptiRecon produces high-quality images having high contrast-to-noise ratios. It allows for fewer projections than the conventional reconstruction method known as Feldkamp-Davis-Kress (FDK), while achieving similar quality as FDK

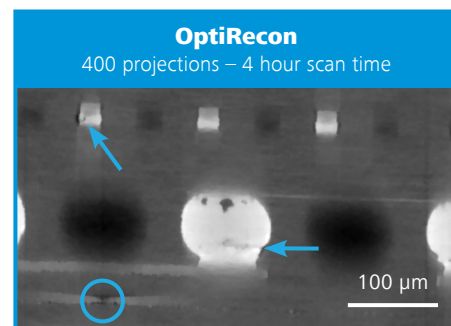
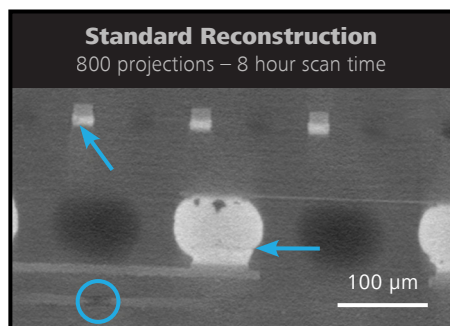
reconstructed images. The reduced number of projections enables significantly faster data collection, even when using low kV settings to maximize image contrast. The ability to see fine features and defects is retained across a broad range of samples and defect types.

Improved Image Quality

OptiRecon can improve image quality of full-projection datasets. Identifying small defects in a >1 mm volume of data can be challenging and requires sharp analytical eyes. High image contrast, high spatial resolution and high signal-to-noise ratios all drive the imaging quality. When applied to full-projection datasets, OptiRecon reduces noise resulting in images with both high contrast-to-noise and high signal-to-noise ratios. This improves defect visualization, reduces eye fatigue for the analyst, and increases FA success rates.



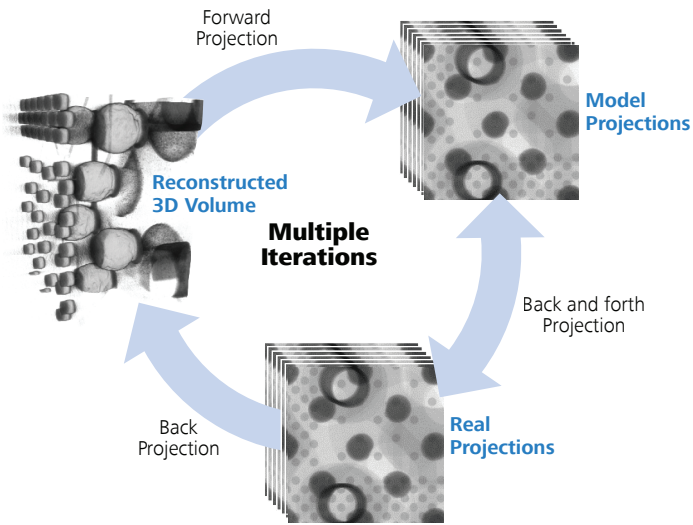
2.5D package: (L) Standard FDK reconstruction; (R) OptiRecon showing superior image quality with the same number of projections and scan time



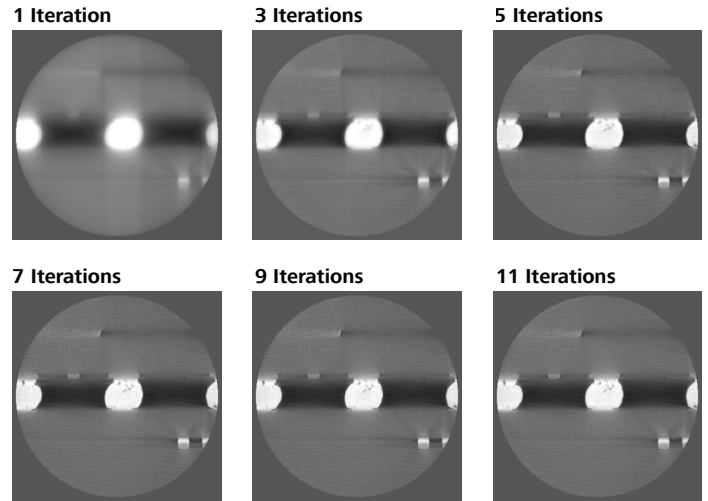
2.5D package: (L) Standard FDK reconstruction; (R) OptiRecon – 2X faster scan speed with superior image quality



Seeing beyond



Iterative reconstructions works by progressively building up a 3D volume over multiple iterations. The volume is then forward projected to create a model set of projections, which are compared with a real projection set. This comparison is used to update the 3D volume so eventually the 3D volume will approach a "best fit" volume with best matching of the real and created datasets.



Fast and Efficient

Iterative reconstruction is significantly more computationally intensive than the standard filtered-back projection technique and can require very long reconstruction times.

OptiRecon features a proprietary, efficient implementation that can achieve reconstruction of a standard dataset of 1024 x 1024 x 1024 voxels from 400 projections in about 5 minutes. It includes an advanced high-performance offline workstation and easy-to-use interface to optimize reconstruction parameters.

User-friendly

Iterative reconstruction as implemented by other manufacturers requires a skilled user with expertise to fine-tune the process parameters for each application. The ZEISS workflow-based OptiRecon user interface has easy-to-use parameter tuning that does not require expertise in tomographic reconstruction techniques.

Set up is accomplished in 4 easy steps:

- Select dataset
- Perform standard parameter optimization: center shift, beam hardening
- Perform OptiRecon parameter optimization with visual feedback: edge preserving and smoothing (noise reduction)
- Reconstruct

OptiRecon is offered via the unique Advanced Reconstruction Toolbox for ZEISS Xradia 3D X-ray systems. It is compatible with ZEISS Xradia 410, 500- and 600-series Versa 3D XRM and Xradia Context microCT. ZEISS offers unprecedented system extensibility with field conversion options and various upgrades like OptiRecon to protect your investment.

ZEISS Xradia Versa XRM
with primary workstation
Standard FDK Reconstruction



ZEISS Xradia Context microCT
with primary workstation
Standard FDK Reconstruction



OptiRecon Module

Software Bundle

- OptiRecon engine
- Manual Reconstruction
- XRM DataExplorer
- XRM 3DViewer

High-performance Offline Workstation

- Dual 10-core processor
- 512GB RAM
- Windows 10, 64-bit O/S
- Dual professional-class 3D GPU
- 30" monitor



microscopy@zeiss.com
www.zeiss.com