Data Analysis at the LSDF for X-ray Tomography at ANKA

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Motivations

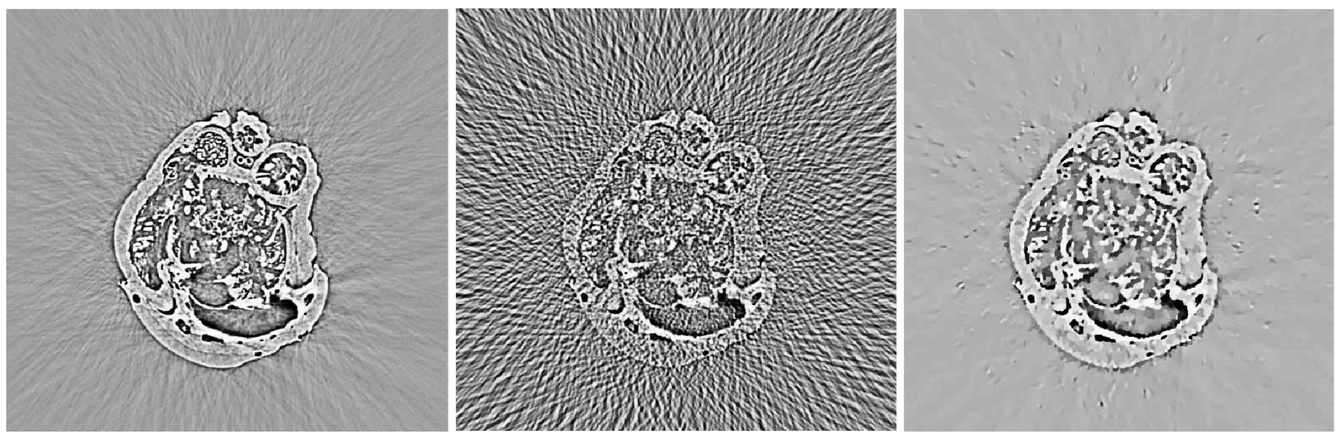
The ultrafast tomography system at ANKA for the study of moving biological samples

- Fewer projections from ultrafast tomography leading to reconstruction with artifacts
- Laborious manual process for data analysis
- Large amounts of data sets and metadata for management
- Time intensive computing

X-ray beamline TOPO-TOMO/IMAGE (top) and Moving biological samples: a living beetle (down left) and African clawed frogs (down right).

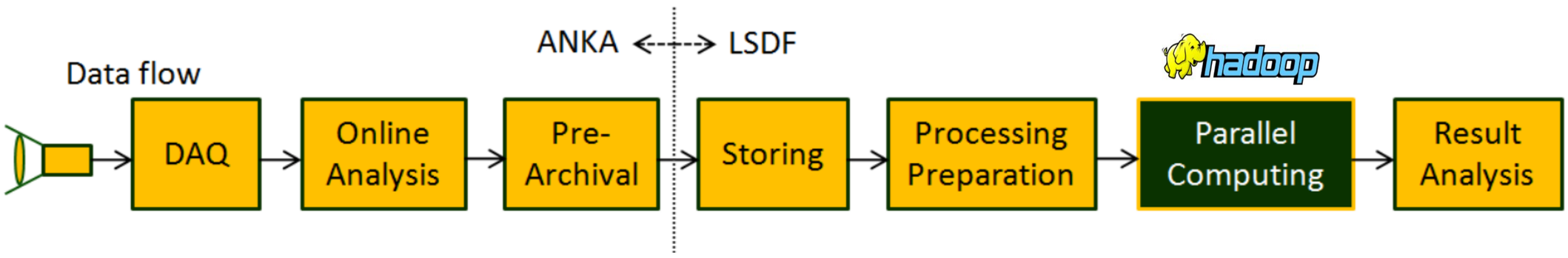
Sparse Reconstruction

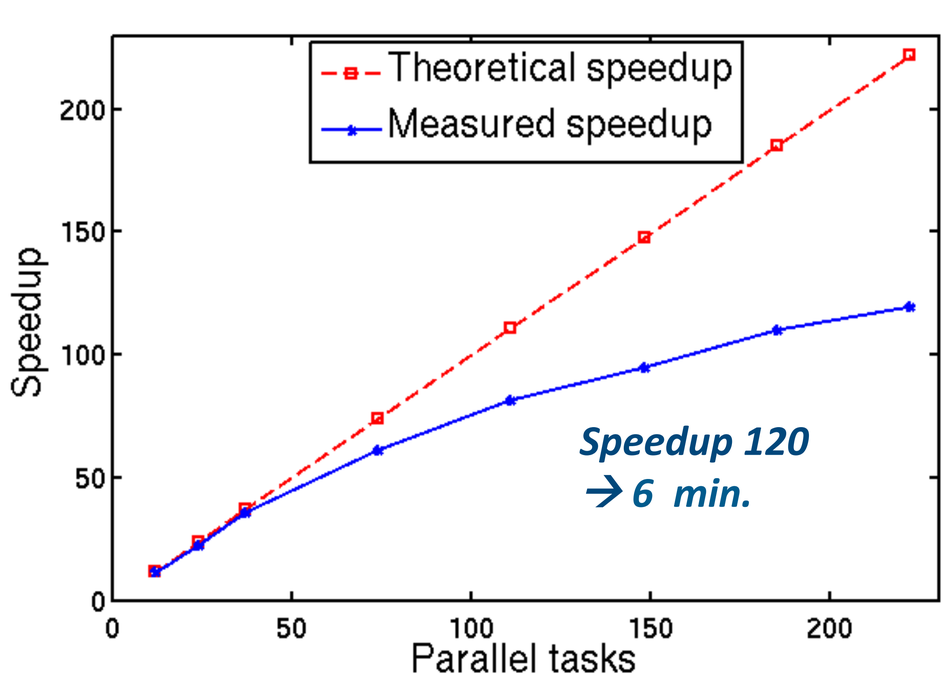
- Standard reconstruction method (FBP: Filtered-back Projection) leads to line artifacts
- Better reconstruction algorithm required: CS-ART



Standard 1500 projections | *Standard 60 projections* | *CS-ART 60 projections*

LSDF Workflow & Parallel Computing





Parallel computing performance of LSDF: reconstruction of a full volume with 1024 slices needs around 6 minutes, and the speedup goes up to 120.

→ CS-ART: ***better*** images

→ ***Automatic*** DIC workflow

→ ***Enables*** the ultrafast tomography beamline

→ ***General***, not limited to ANKA

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