Local tomography in electron microscopy

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Abstract

Tomographic techniques, in which samples are viewed from multiple directions, are used in electron microscopy. Often, the molecules are all different (rather than copies of one single molecule in different orientations), and one wants to image the individual molecules. Therefore, any algorithm for this problem must reconstruct each molecule independently. The problem is local because the electron beam is only wide enough to penetrate a small part of the object. Furthermore, the data are limited angle since the object cannot be rotated through a full 180^{circ}. For these reasons, some data are missing, and inversion is unstable. The author will explain how singularities can be added (similar to the added singularities in cone-beam CT). The author will present a refined local algorithm and reconstructions (pictures) using his algorithm.