doi:10.1017/S1431927622004780
Microsc. Microanal. 28 (Suppl 1), 2022

Glacios Enhancements for High Throughput, High Resolution Structure Determination Supporting Multiple Acquisition Methods without Performance Compromise

Alevtyna Yakushevska, Adrian Koh, Abhay Kotecha and Jeffrey Lengyel

Thermo Fisher Scientific, Waltham, MA, USA

Cryo-EM has revolutionized the field of structure biology due to its capabilities resolving the three-dimensional structure of proteins, protein complexes and other biological macromolecules at high or even atomic resolutions. Particularly, the Cryo-EM single particle analysis (SPA) method and Cryo-Electron Tomography (Cryo-ET), have emerged where SPA is well-suited approach for the determination of native protein function and the dynamics of complex biological systems. CryoET is a cryogenic imaging technique that provides 3D datasets of larger structures such as large protein complexes, organelles and even parts of the cell. There is also electron diffraction method, MicroED, that allows for 3D structure determination of small chemical compounds and biological macromolecules.

Improved Thermo Scientific™ Glacios is a 200kV FEG Cryo-EM built for delivering high throughput and high-resolution structures of proteins. Glacios is equipped with Selectris Imaging filter and Falcon 4i direct electron detector for the highest image quality and built-in fringe free imaging and aberration free image shift for high throughput data collection. Importantly, the Glacios is designed with ease of use for new users who are not experts in electron microscopy. Furthermore, it is optimized for supporting data collection on multiple grids without compromising on quality or performance. We will show that using this system we achieved 1.6Å resolution with Apoferritin sample within 7hr of data collection and a throughput of ~700 movies/hr. We will also show the use of Glacios for cryo-ET method allowing cellular structure biology at high resolutions.