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Date: Monday, June 15th, 2015
Time: 10:00 – 11:00 am
Venue: C209, Center Bldg., Level C

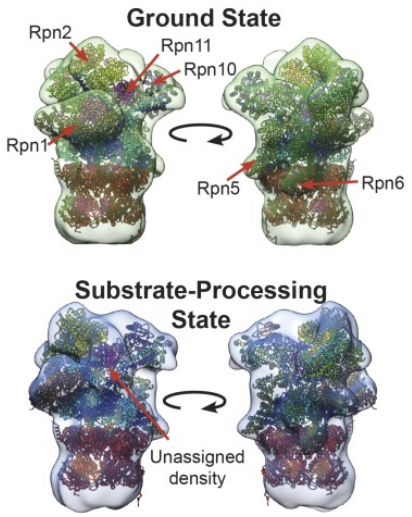
"Automated Cryo-tomography and Single Particle Analysis with the Volta Phase Plate"

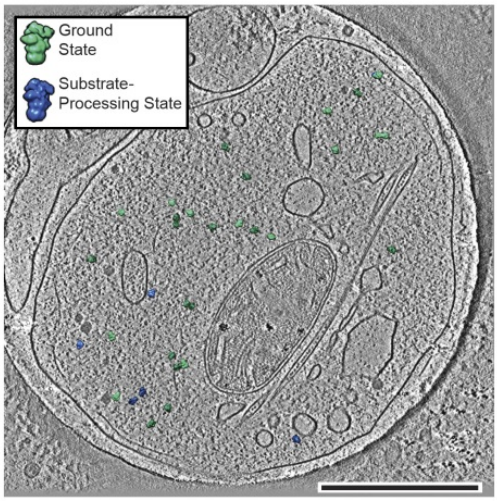
Abstract:

Recent years have shown an increased interest in the development and use of phase plates in cryo-EM. The oldest and the most productive type of phase plate is the thin film Zernike phase plate. It has been successfully used in cryo-tomography and single particle analysis applications. Despite its good performance the Zernike phase plate has a few pitfalls. One major practical hindrance is its short lifetime. Typically within 10 days after being installed into the microscope its performance deteriorates to the point where it has to be exchanged. Another disadvantage of the Zernike phase plate is that it produces fringes around high-contrast features in the image, such as lipid membranes, support film edges etc. Despite its shortcomings the Zernike phase plate has been the main motivation and experience generator in the last years.

In collaboration with the FEI Company we recently developed a new type of phase plate – the Volta phase plate. It addresses both shortcomings of the Zernike phase plate discussed above. Our tests indicate that the new phase plate lasts for more than six months inside the microscope. This is a big advantage in terms of servicing and up time of the microscope. The other big advantage of the new phase plate is that it produces fringe-free images which resemble in appearance light microscopy phase contrast images.

The Volta phase plate was tested with the two main 3D cryo-EM techniques – cryo-tomography and single particle analysis. Comparing the results with what has been published shows that it performs significantly better than the thin film Zernike phase plate. The improvements are both in image appearance and resolution.





"A molecular census of 26S proteasomes in intact neurons", Asano et al., *Science* **347** (2015)

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