

Measuring large bio-molecules with electron phase tomography

In electron tomography of large bio-molecules (for instance, human γ -secretase, see Fig. 1), conventionally high electron voltages of 300 kV or even higher are preferred so that the whole molecule is in focus at once. However, this causes severe damage to the molecule and only extremely low electron doses can be used.

Inverse dynamical electron scattering (IDES), our in-house GPU-based reconstruction algorithm, takes the propagation of the electron through the object into account exactly and thus is not bound to these high voltages and the accompanying beam damage. Furthermore, sparsity constraints can be applied to improve the result.

In this project a quantitative comparison is made between the resolution and the noise in the reconstruction from projections at different electron voltages and different doses. This will be correlated to the damage that the molecule has suffered.

Email: vandenbroek@physik.hu-berlin.de | url: <https://www.physik.hu-berlin.de/en/sem>

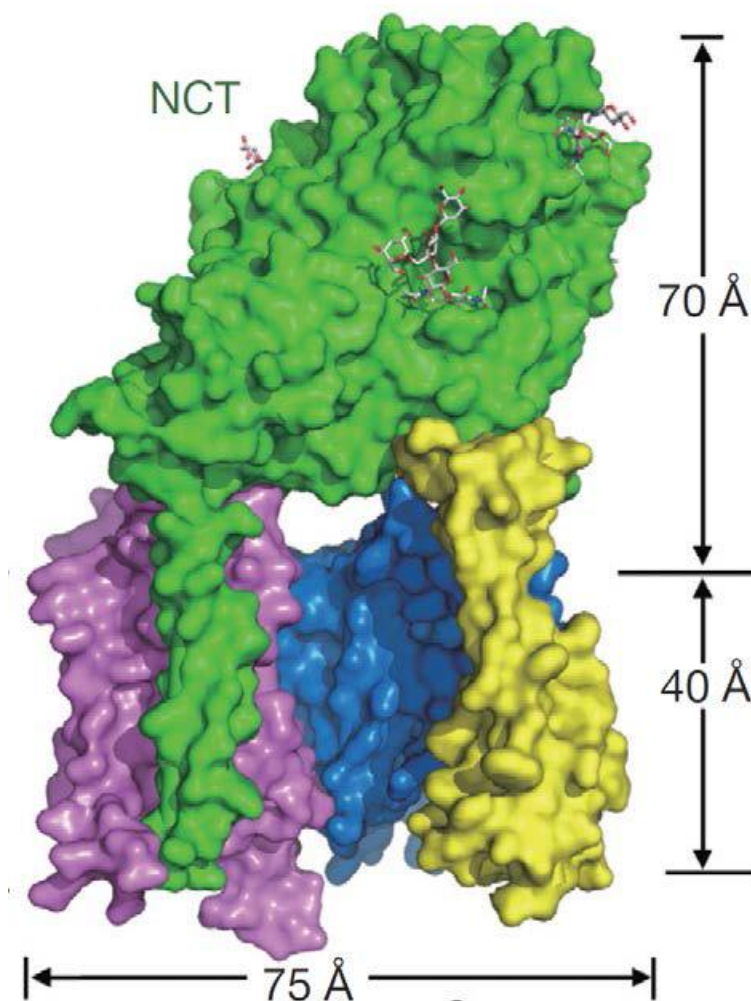


Fig. 1. Atomic structure of human γ -secretase. Source: Xiao-chen Bai et al. Nature **525** p. 212–217 (2016)