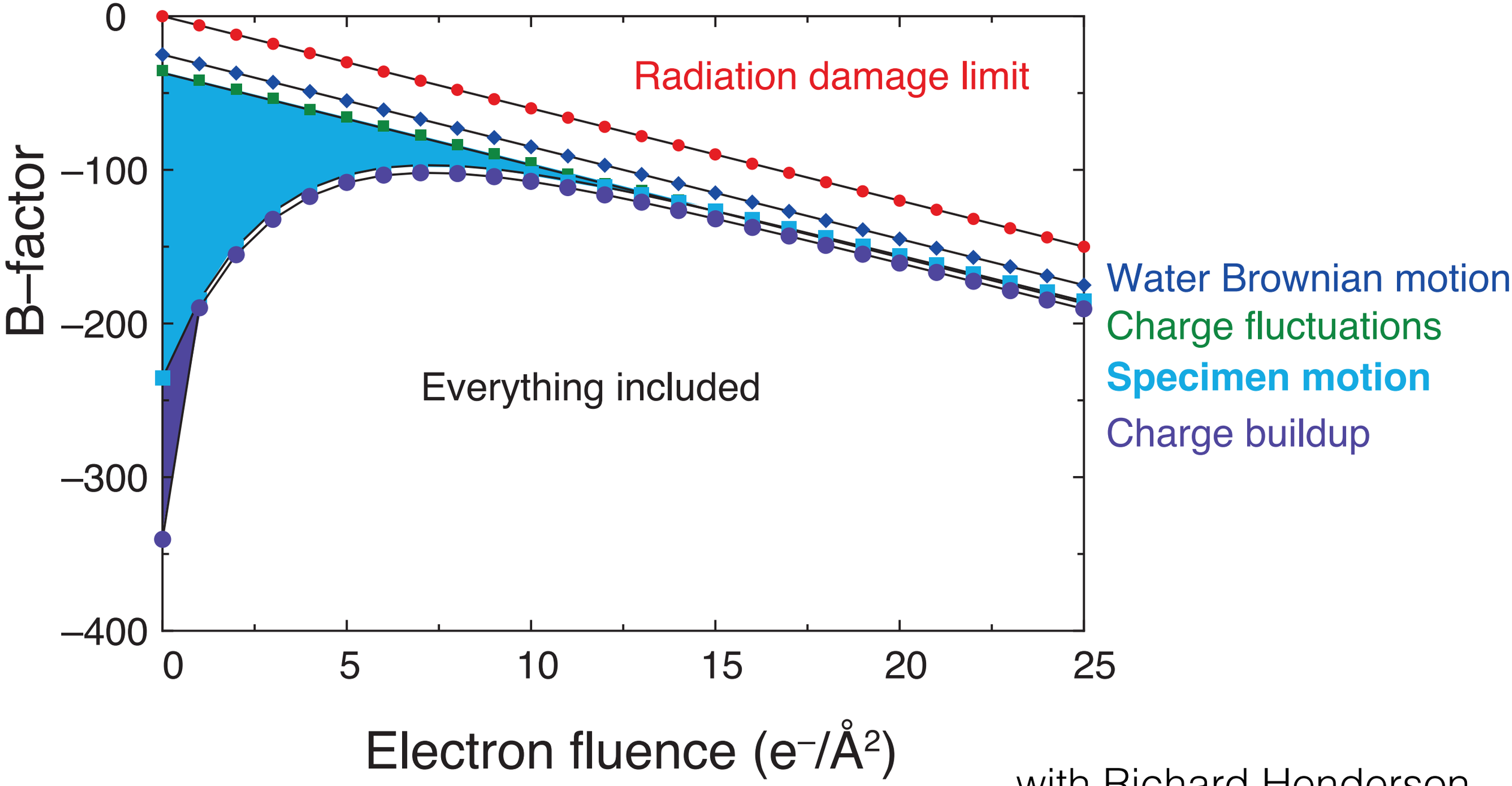
The Rough Grand Scheme - toward a complete physical theory of cryo-EM



with Richard Henderson

Thon rings from amorphous ice and implications of beam-induced Brownian motion in single particle electron cryo-microscopy

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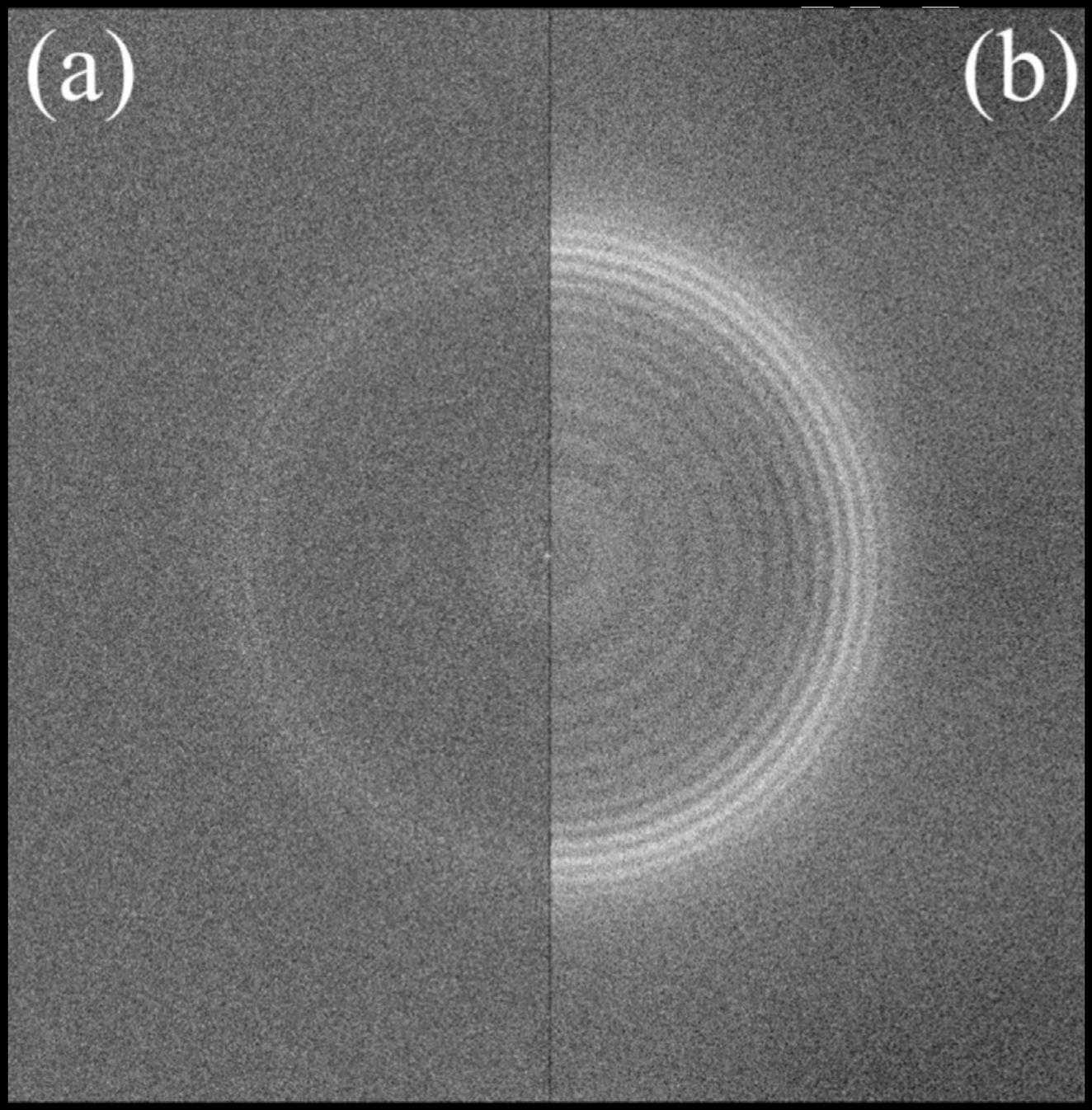
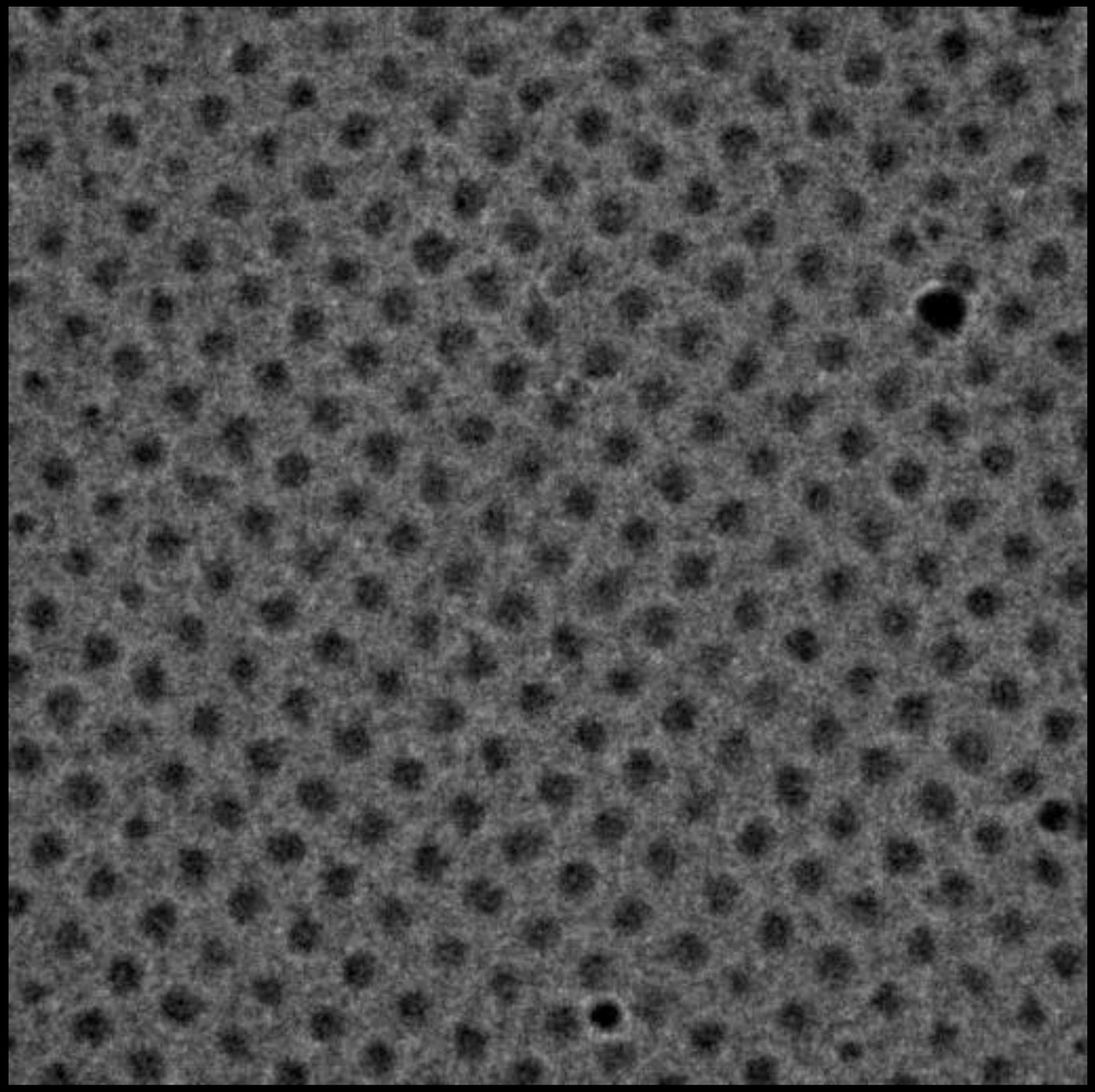


During electron irradiation
water diffuses
1 Å RMS in 1 $e^-/Å^2$

Causes Brownian motion
of imbedded proteins

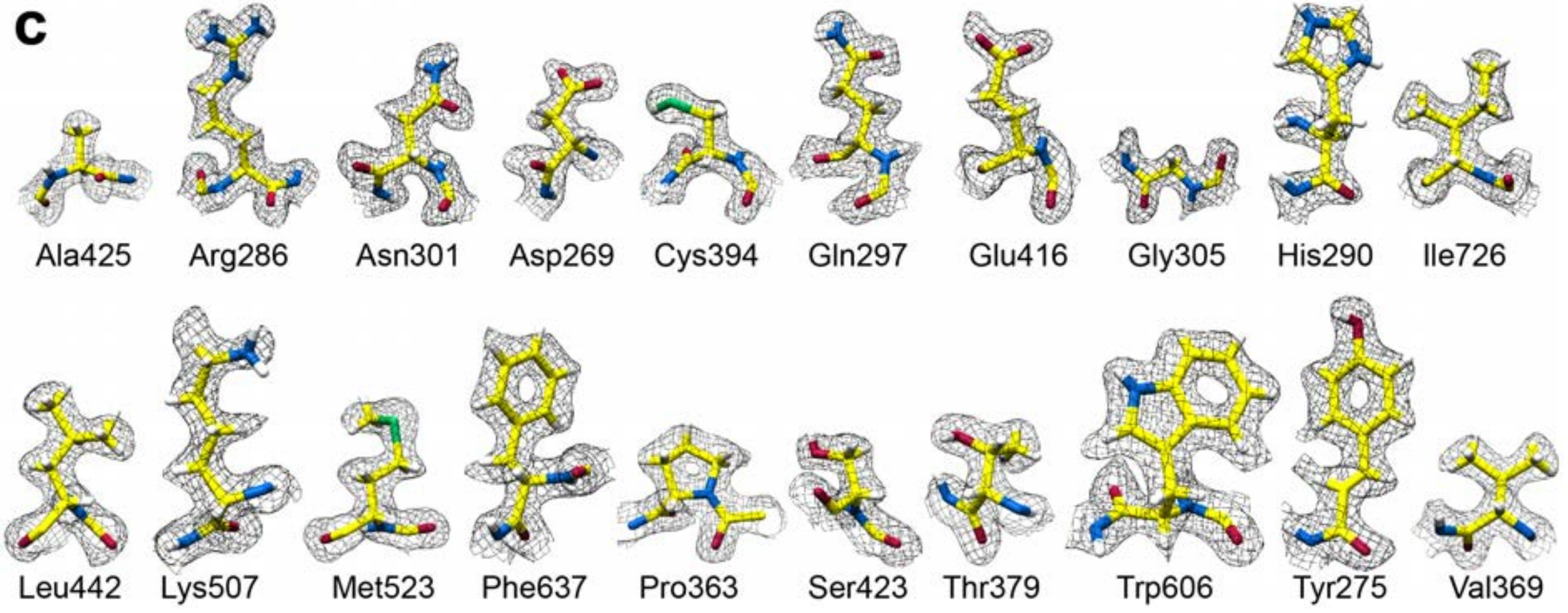
Ultramicroscopy 2015

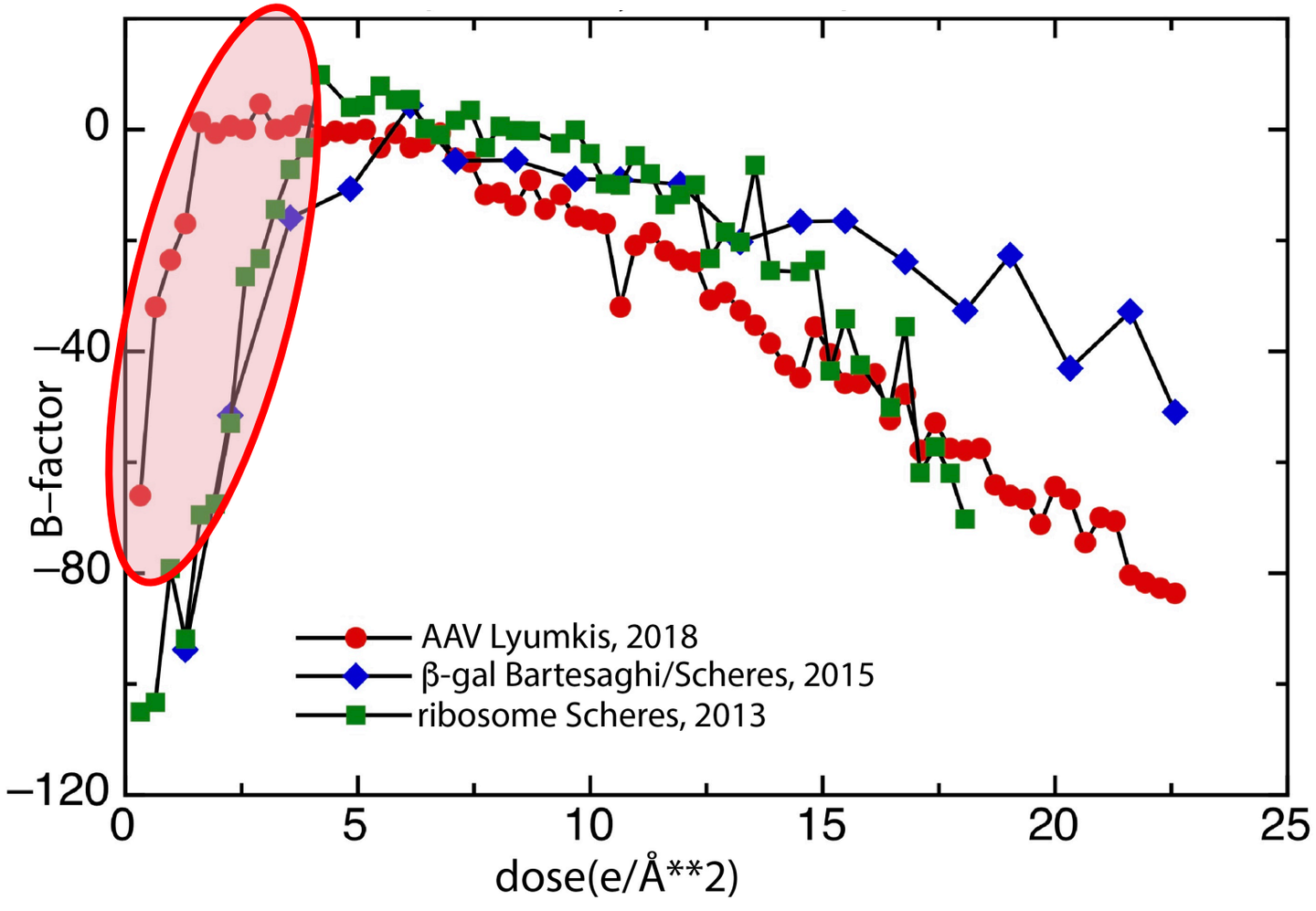


40 µm field of view
60 mm defocus
1.2 µm holes filled with
amorphous solid water 80K
300 keV 10^{-4} el/Å^2/frame

central patch
300 keV 1 el/Å^2

Russo & Henderson 2018a





Reduced movement on gold grids

from Tan *et al.* 2018