

Abstract Submitted  
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**Holography with Low Energy Electrons - a New Tool for Structural Biology**<sup>1</sup> TATIANA LATYCHEVSKAIA, HANS-WERNER FINK, University of Zurich — Holography is widely used for three-dimensional imaging of macroscopic objects using visible light. The same principle can also be applied for imaging of individual molecules like DNA or larger objects, for instance viruses. The holograms are recorded with coherent low energy electrons with wavelength, and thus potential resolution, in the sub-nanometer regime. The experimental setup together with holograms of individual biological molecules and their numerical reconstructions shall be presented. Current experimental and theoretical challenges of holography with low energy electrons will also be addressed. Strong forward scattering of electron waves has been taken into account for the reconstruction process. Since most biological molecules exhibit phase shifting rather than absorbing properties, the retrieval of the phase parallel to the absorbing properties of an object has been realized. On the experimental side, a method towards a significantly improved signal to noise ratio in holograms has been established by acquiring several hundred short pulsed holograms followed by a cross correlation alignment. Finally, the solution to the twin image problem in holography will be presented and reconstructed twin-image free experimental holograms will be shown.

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Tatiana Latychevskaia  
University of Zurich

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