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Correction of Spherical and Chromatic Aberration for a Dedicated Low Voltage TEM

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The new electron optical capabilities owing to the successful development of correctors of the spherical and chromatic aberration have opened a new field for electron microscopy: the low-voltage TEM. For further investigations in this field of microscopy a dedicated low-voltage TEM has been developed. The key component of this instrument is a new quadrupole-octupole corrector for the compensation of the chromatic and spherical aberration of the objective lens. Besides this off-axial aberrations must be compensated or, at least, taken into account during the optical design. Thereby, a large field of view can be imaged at high resolution even at low beam energies. The novel instrument has been designed and constructed for the German SALVE project at Ulm University. It will be available for materials science and life science applications from summer 2013 onwards. Before, however, the instrument development has to be fully completed and the theoretical specifications have to be proven. The optical specifications are related to the energy and we should be able to achieve from 20 kV - 80 kV always an acceptance angle of 50 mrad with respect to the specimen. This would lead to parameters as shown in Tab.1. The prototype corrector is ready for incorporation into a Zeiss LIBRA TEM. Beam-down is scheduled for July, 2012. At the meeting we will report about our first experience and give some impressions about low-voltage TEM. Also first results from the instrument should already be available and will be demonstrated