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Advanced electron optics for vibrational spectroscopyJ.L. Erskine^a^aDepartment of Physics, University of Texas, Austin Texas 78712 U.S.A.

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Abstract

Requirements for a next generation high resolution electron energy loss spectrometer for probing surface vibrations are proposed based on several specific applications in which the performance of present generation instruments is marginal or totally inadequate. Prospects of achieving significant improvements are explored and found to be very good for applications which involve studies of impact scattering phenomena. Results of zoom lens ray tracing studies, analysis of electron trajectories and exit plane images in a hemispherical analyzer in relation to multichannel energy detection and studies of electron trajectories near various field terminators are presented. A prototype analyzer / monochromator design is described which will be used to test the model calculations and to extend the applications of EELS to more detailed studies of impact scattering.

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