**Correlations in Inelastic Scattering and Plasmon Filtered Imaging**

Tobias A. Colson, A.F. Moodie, H.J. Whitfield, *Department of Applied Physics, School of Applied Sciences, RMIT University, GPO Box 2476V, Melbourne, 3001, Australia.* E-mail: tobias.colson@rmit.edu.au

It is often assumed that inelastic electron scattering from the plasmon is incoherent and confined to small angles. However it can be seen that this is not the case in elements and compounds that share the 'simple' metal form of electron correlation. A continuous electron density distribution results in a characteristic 'bare' plasmon spectrum. In this case it can be shown that through the filtering of electrons that have suffered multiple interactions with the plasmon region of a material, images can be formed from regions at thicknesses that would conventionally provide little to no contrast [1].

However, in order for this to occur, the primary interaction must be with conduction electrons, thereby generating a 'bare' plasmon form of low loss spectrum. When the primary interaction is no longer with the conduction electrons, then this 'bare' or simple form is lost.

Thus we endeavour to show that analysis and imaging from the low loss spectrum of EELS can provide information not only about the physical structure of the material e.g. dislocations, but also about electronic properties beyond the band gap.

[1] Moodie A.F. et.al*., ultramic*, 2004, **101**, 247.

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