

From form factors to vortex electrons: Following Ariadne's thread

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Since the days when spectrometers for the TEM became commercially available, EELS has seen enormous theoretical and experimental progress. Fundamental problems concerning the inelastic interaction of fast probe electrons with matter have occupied the community for decades. It turns out that inelastic scattering can be understood on the basis of the dynamic form factor and its generalisation, the mixed dynamic form factor (MDFF), introduced by Harald Rose more than three decades ago. Amazingly, the experimental verifications of this concept rely on two other well-known contributions of the same researcher: energy filters and correctors.

Like Ariadne's thread in the Greek myth, the MDFF is a guide through the maze of so disparate aspects of inelastic interactions as coherence, delocalisation, mapping of orbitals, circular dichroism, and vortex electrons.