

TEM AND THE ELECTRON-STRUCTURE INTERACTION: EXPERIMENTAL AND QUANTUM FIELD THEORETICAL ASPECTS

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In this work through the TEM observation of diffraction microphotographs we discuss several aspects of the behaviour of the electrons in the interaction with the material scattered. From the pure quantum mechanical point of view we use well known Born approximation to obtain the wave amplitude in a simple form in order to understand roughly the problem: electronic and probe features before, at the moment and after the interaction. Introducing of the quantum field theoretical approach, the construction of new theoretical models that have account on the interaction electron-phonon in crystalline and amorphous samples are explicitly made. The comparison with the pure quantum mechanical results previously obtained and with other models in the literature are briefly discussed.