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LEED structural analysis of strongly correlated systems: reaching the limit of the instrumentation? TEYU CHIEN, BIAO HU, Dept. of Physics & Astronomy, U. of TN, Knoxville, SHUHENG PAN, Dept. of Physics, U. of Houston, V. BRAUN NASCIMENTO, E. WARD PLUMMER, Dept. of Physics & Astronomy, LSU — In strongly correlated systems, like transition-metal oxides and the Iron Pnictides, subtle changes in structural parameters can cause dramatic changes in the physical properties. Breaking the symmetry by creating a surface is a controlled way to explore the structure-functionality relationship. Low Energy Electron Diffraction (LEED) $I-V$ has been one of the most used surface structural techniques, but there are inherent and instrumental limitations which will be discussed using data from surfaces of transition-metal compounds. Using CCD cameras and new data analysis three dimensional plots of diffraction vs parallel momentum can be created. Spot intensity, width, position, and profile, as well as the diffuse background can then be quantitatively extracted and evaluated. We will show how to couple the STM with LEED using data from the parent superconducting compound $BaFe_2As_2$. The inherent limitations of the existing system are tested using Cu(100).

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