

Figure 1. Amplitude variation for first three of principal component components analysis, PCA, (a, b and c respectively) of images in a movie of RHEED oscillation on GaAs(001). PCA was performed using the images in the red section to determine the principal components. These principal component were projected onto images in the black section. This demonstrates that largely PCA analysis can be used if the condition can be reproduced carefully

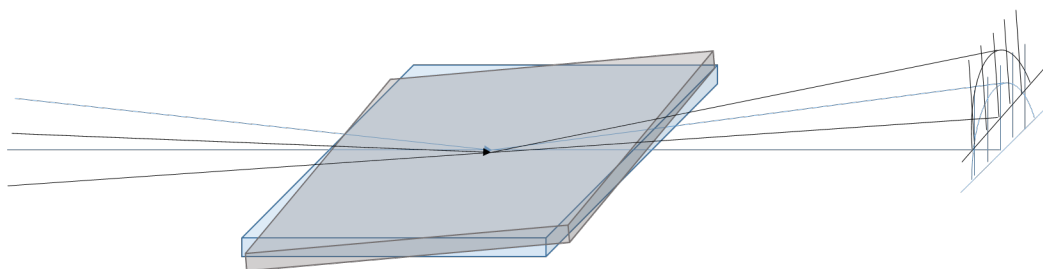


Figure 2. Diagram showing variation between to samples with slightly different tilts. Tilts in the direction of the RHEED pattern to shifts and even after the angle of incidence is reproduced. Tilts perpendicular to the beam direction cause rotations in the RHEED. At a minimum the RHEED images must be translated and rotated to provide maximum overlap to use components from a previous analysis.

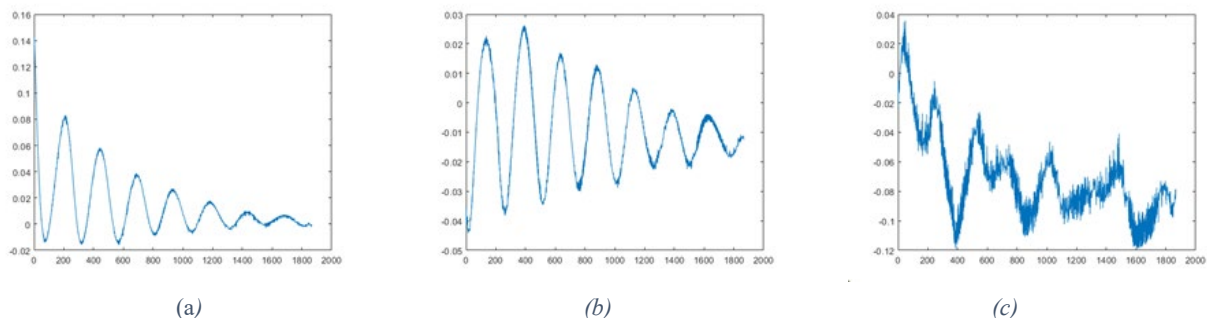


Figure 3. Amplitude variation for first three components using the principal components (a, b and c respectively) determined previously (see Figure 1) on movie from a new sample. Each image in the new movie was align to the previous movie using the same transformation which included a translation, rotation and scaling.