Section 0.1.5 Measurement of Distances in HRTEM Images

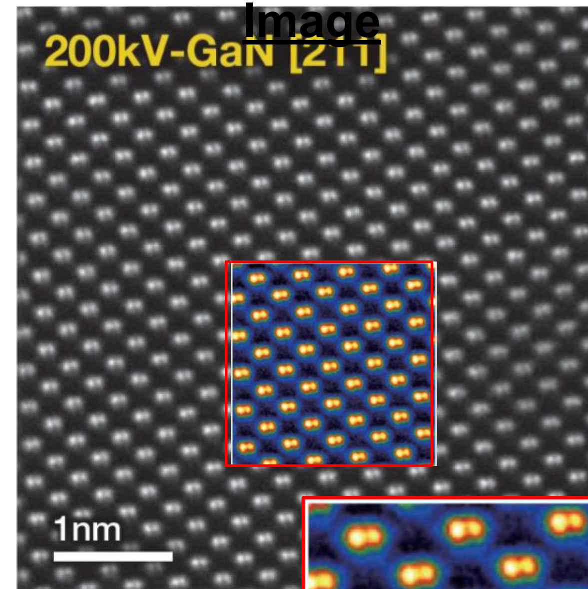
Atomic Resolution Images to measure distances in fraction of nm (pm).

Interplanar Distances.-
Crystalline materials could have changes in their structure due to strain, changes in crystal structure.

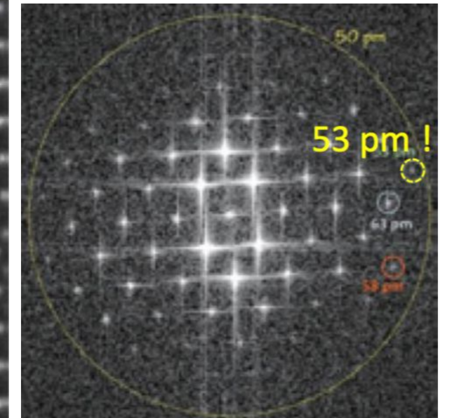
It is important to have a well calibrated microscope to accurately measure distances. The microscope is calibrated using a standard sample, such as STEM images of Si or GaN of known interatomic distances, i.e, distance between Si-Si or Ga-Ga dumbells

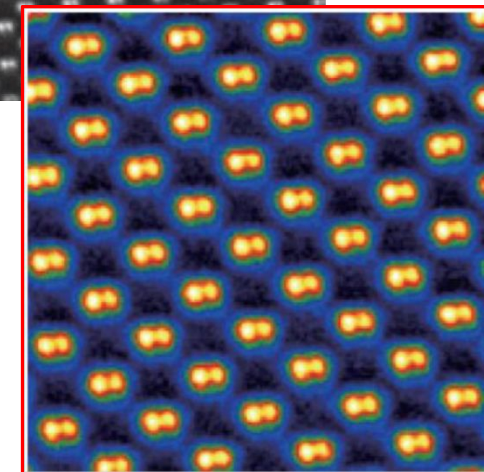
Example: in the $Si_{20}Ge_{80}$/Si sample the properties of the device depend on the thickness of the Ge, and $Si_{20}Ge_{80}$ layers. Variations in the thickness of the Ge or SiGe layers affect the properties.

HAADF STEM Image



FFT





Ga-Ga dumbbells split by 63 pm

From JEOL