

# Observing properties of graphite and gold atomic lattices using the STM

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## **Abstract**

This experiment ventured to observe the properties of the graphite and gold atomic lattices using the Naio Scanning Tunnelling Microscope. Most of my time with the equipment was spent determining the ideal parameters to image graphite (pg. 23-32). I did this by starting at the 200-500nm scale, zooming in on a recognizable surface feature, and changing the parameters to improve the image quality. I repeated this process until achieving atomic resolution, about a 5nm length scale (pg. 29, image on pg. 79). Measuring the diameter of a single carbon atom on Image00077 resulted in a value of 113.3 pm (pg. 36-37), although the uncertainty in this value should be large due to the quality of Image00077 making it unclear where the boundaries of each atom are. Further analysis notwithstanding, this study can conclude only that the carbon atom has a diameter at the scale of 100pm, which seems to agree with the nominal value of a 70pm radius.

I also spent some time imaging a gold lattice for this experiment (pg. 33-34). I was able to find the atomic lattice almost instantly using a scanning time of 0.3s/line, but the image was extremely distorted.