**Readme**

Figure 1 is created using the jupyter notebook: Figure1.ipynb. This uses the survey image, Scan5\_survey.png and the full 4DSTEM dataset Ti550 005.hdf5 as its inputs.

Figure 2 is created using the jupyter notebook: Scan5\_ACOM\_auto.ipynb, which also produced the full .ang files that are used in the further analysis. This uses the full 4DSTEM dataset Ti550 005.hdf5 as the main input for data, and the cif files Ti\_alpha.cif and Ti\_beta.cif for the structures it matches to.

These .ang files for alpha and beta are combined into one containing the best matching phase (ie highest correlation index) in each pixel using the jupyter notebook: CombineMapsByComparingCI.ipynb

Figure 3 is created using the jupyter notebook: Scan5\_orix\_13\_10.ipynb which uses the combined alphabeta .ang file as its only input, but does need orix installed. This was tested with the following version (from pip freeze report):  
orix @ git+https://github.com/hakonanes/orix.git@73ed8720355284ff3e591c050f3c6aa03bfcc348

(This was a particular version testing some new features that were then fully rolled into later releases but have not been checked with this notebook at time of writing)

Figure S1 is created using the jupyter notebook: Scan5\_orix\_13\_10\_betaonly.ipynb, which just uses the beta .ang file as an input.