"SmartAlign" Scan-distortion Compensator
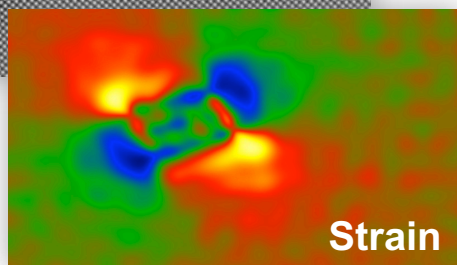
Rigid & Non-rigid Image Registration

SmartAlign

DigitalMicrograph Plug-in

ADF (After)

BF (After)

STM (Before)

STM (After)

ADF (After)

Strain
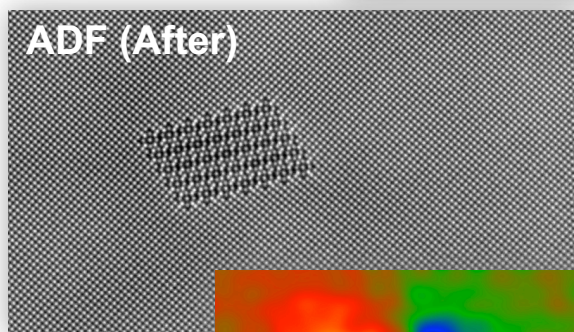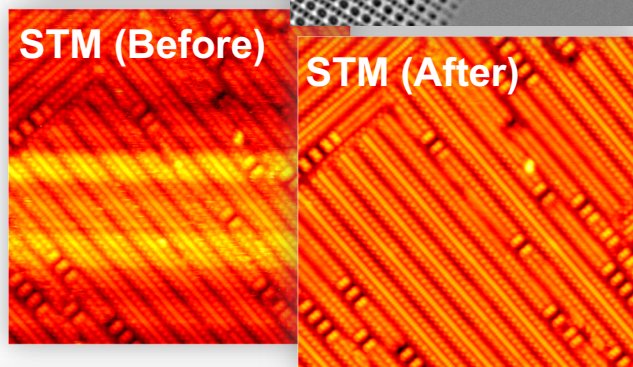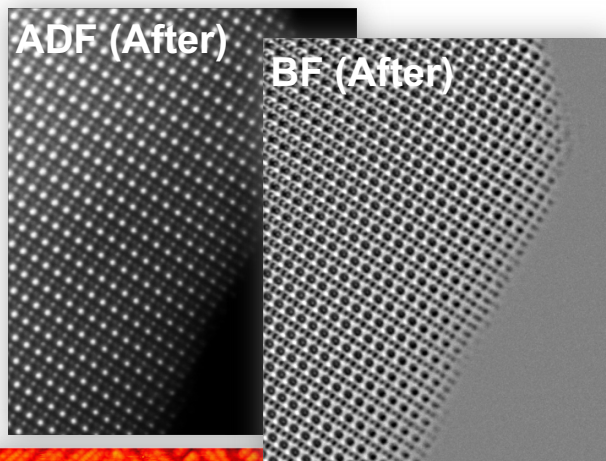
SmartAlign corrects for stage drift and scan distortion using fast multi-frame image acquisition, and improves resolution, signal-to-noise ratio, and image-intensity distribution [1].

Image-drift causes scans to appear sheared, and non-linear scan-distortions deforms image intensity distribution. The SmartAlign will effectively counter both of these effects, and deliver the images that can be further analyzed quantitatively, say for composition and strain.

Key Features

◆ Intuitive and interactive workflow for efficient image registration.

◆ Correction of image offsets, linear drift and non-linear distortion.

◆ No prior sample knowledge nor symmetry assumption required.

◆ Correction of distortions across multiple signals, e.g. ADF/ABF.

◆ Support for multi-frame spectrum-image to increase SNR.

◆ Support for digital super-resolution mode.

◆ Custom options included for TEM, STEM, STM/AFM.

Template matching module (Optional) finds the repeated regions, and aligns them with non-rigid registration. Thus, this module is extremely suitable for data that has been acquired by scanning techniques.

References:

[1] L. Jones, H. Yang, T.J. Pennycook, M.S.J. Marshall, S. Van Aert, N.D. Browning, et al., "Smart Align—a new tool for robust non-rigid registration of scanning microscope data", *Advanced Structural & Chemical Imaging* **1**:8 (2015) doi:10.1186/s40679-015-0008-4.