CLAIMS

1. An optical microscope having a resolution of less than 100nm, the optical microscope comprising:

a first optical microscope; and

a second optical microscope with a different mode of operation to the first optical microscope;

wherein the first optical microscope is a confocal microscope and the second optical microscope is a total internal reflection fluorescence microscope, wherein the optical microscope is configured such that the first optical microscope and the second optical microscope simultaneously view a sample and wherein the second optical microscope is used to correct drift from the first optical microscope based on computer processing of already captured and stored images.

2. The optical microscope according to claim 1, wherein the first optical microscope uses a first light source and the second optical microscope uses a second light source; and the first light source is different to the second light source.

3. The optical microscope according to claim 1 or 2, further comprising an objective lens, wherein the first light source and the second light source pass through the objective lens.

4. The optical microscope according to claim 3, wherein the objective lens has a numerical aperture of at least 1.37.

5. The optical microscope according to claim 3 or 4, wherein the optical microscope is configured such that a sample for imaging is located below the objective lens.

6. The optical microscope according to any one of the preceding claims, wherein the optical microscope is housed in a single housing.

7. The optical microscope according to claim 6, wherein the single housing is in one and only one piece.

8. The optical microscope according to any one of the preceding claims, wherein a computer of the optical microscope is configured to capture and store a plurality of images of a sample over time.

9. The optical microscope according to claim 8, wherein the computer processes the plurality of images to provide an output image.

10. The optical microscope according to claim 8 or 9, wherein the second optical microscope is used to correct drift from the first optical microscope and/or the sample in the X,Y plane or horizontal plane based on the stored plurality of images of the sample over time.

11. The optical microscope according to claim 10, wherein the second optical microscope is used to correct drift from the first optical microscope and/or sample using at least one reference element located relative to the sample.

12. The optical microscope according to claim 11, wherein the at least one reference element has a diffraction limited intensity distribution of emitted light.

13. The optical microscope according to any preceding claim, wherein the first optical microscope is used to correct drift from the first optical microscope and/or the sample in the Z direction or vertical direction.

14. The optical microscope according to any one of claims 11 to 13, further comprising a beam splitter and at least two detectors configured to detect light from the sample split by the beam splitter from the first optical microscope.

15. The optical microscope according to claim 14, wherein the detectors are at a calibrated focal plane within an axial confocal volume of the first optical microscope.