FIGS. **5***e* and **5***f*. Individual tips could also be chemically cleaned, for instance by washing gold tips with a reducing agent to cleave cysteine labeled protein bound to gold coated tip.

2.7 Exchanging Different Type of Tips

[0077] This process can be repeated with different types of tips. For tips whose structure was highly asymmetric (e.g. Olympus biolevers), we found a large offset in the one axes but a small offset in the other (e.g. [0 nm, −1000 nm]. This was offset generally reproducible between tips with the same class. Thus, this non time varying offset can be subtracted once characterized. For improved registration of these highly asymmetric tips, it is advantageous to align the tip and the stage in three dimensions.

[0078] The invention has been described in detail with particular reference to certain preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

1. A method for rapidly and repeatably bringing sharp objects into close proximity to a particular region of interest of a surface comprising:

a. projecting laser light onto a first tip region of a scanning probe microscope to produce back-scattered light;
b. projecting laser light onto a region of interest of a sample to produce back-scattered light;
c. receiving the back-scattered light by a photosensitive device, said photosensitive device converting the received back-scattered light into one of electrical or optical signals capable of identifying the dimensional positions of said first tip and said region of interest;
d. aligning said positions with respect to said laser light;
e. providing an output control signal related to the signal output from the photosensitive device from a feedback algorithm/process to a precision positioner to stably maintain said positions over a time interval;
f. removing the first tip of the scanning probe microscope;
g. replacing the first tip of the scanning probe microscope with a second tip; and
h. returning said second tip to the identified dimensional positions of said first tip and said region of interest with said precision positioner.

2. The method of claim **1** wherein said dimensional positions are 1, 2 or 3 dimensional positions.

3. The method of claim **1** wherein said receiving the back-scattered light occurs from either below or above the surface of said region of interest of a sample.

4. The method of claim **1** wherein said second tip is the first tip, wherein said first tip has been cleaned or otherwise processed after said removing but before said replacing.

5. The method of claim **1** wherein said second tip is the same class or type of tip as the first tip.

6. The method of claim **1** wherein said second tip is a different class or type of tip than said first tip.

7. The method of claim **6** wherein said returning further comprises an algorithm having a reproducible offset for said different class or type of tip, which offset can be quantized and removed.

8. The method of claim **1** wherein said removing, replacing and said returning is additionally repeated.

9. The method of claim **1** wherein at least one of said removing, replacing and returning follows a time interval.

10. The method of claim **1** wherein said aligning locates an absolute center of said tip region or said region of interest.

11. The method of **1** wherein the tip region is the tip.

12. The method of claim **1** wherein the tip region is a fiducial offset from the tip.

13. The method of **1** wherein the region of interest is a fiducial mark.

14. The method of claim **1** wherein the region of interest is a structure possessing an inherent property that interacts with light to act as though it is a fiducial mark.

15. The method of claim **1** wherein the region of interest is a structure located at a lateral offset from a fiducial mark.

16. The method of claim **1** wherein said sample comprises an array of fiducial marks.

17. The method of claim **1** wherein two lasers are used for projecting laser light onto said first tip region of a scanning probe microscope to produce back-scattered light and projecting laser light onto a region of interest of a sample to produce back-scattered light.

18. The method of claim **1** wherein said method is conducted at room temperature.

19. The method of claim **1** wherein said method is conducted in air or fluid.

20. A method for rapidly and repeatably bringing sharp objects into close proximity to a particular region of a surface comprising:

a. projecting laser light onto a first tip region of a scanning probe microscope to produce back-scattered light;
b. projecting laser light onto a first region of interest of a sample to produce back-scattered light;
c. receiving the back-scattered light by a photosensitive device, said photosensitive device converting the received back-scattered light into one of electrical or optical signals capable of identifying the dimensional positions of said first tip and said feature;
d. aligning said positions with respect to said laser light;
e. providing an output control signal related to the signal output from the photosensitive device from a feedback algorithm/process to a precision positioner to stably maintain said positions over a time interval;
f. replacing the first region of interest of a sample with a second region of interest of a sample;
g. projecting laser light onto said second region of interest of a sample to produce back-scattered light and repeating said receiving the back-scattered light by a photosensitive device, said aligning said positions with respect to said laser light, said providing an output control signal related to the signal output from the photosensitive device from a feedback algorithm/process to a precision positioner to stably maintain said positions over a time interval with respect to said tip region and said second region of interest of a sample; and
h. returning said tip region to the identified dimensional positions of said tip region and said first region of interest with said precision positioner.

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