

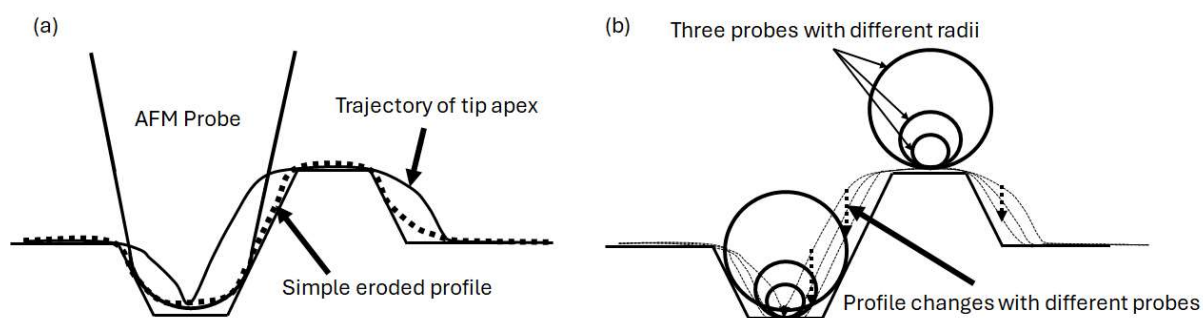
# 3D image reconstruction method with multiple probes

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It is known that AFM images are a dilation of the probe shape and surface morphology. The blind reconstruction method and image erosion method are often used to reconstruct images measured by atomic force microscopes (AFM) and remove distortions according to the shape of the probe tip <sup>[1,2]</sup>. This method can remove the unevenness of the probe tip on the surface protrusion. However, the depth of the depressions and deep holes cannot be fully restored. As shown in Figure 1(a), these behaviors often cause problems in calculating the surface roughness after image reconstruction because the amplitude of the profile is not correctly restored <sup>[3]</sup>. A new method has been developed to reconstruct AFM images using two or more probes to restore the depression area, as shown in Figure 1(b). The maximum points of the AFM probe trajectory do not change when different probes are used. However, the local minimum points of the surface profile change when probes with different probe radii are used. Furthermore, how the depth changes can be estimated from the profiles of different AFM probes. This behavior is more suitable for roughness measurement compared to the simple image erosion method. In this presentation, we compare the image reconstruction method with an example of an AFM image.



**Figure 1.** (a) A simple image erosion method. (b) Image reconstruction from multiple AFM probe profiles.

## Reference

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