
Control of Atomic Force Microscopes

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AFM Fundamentals

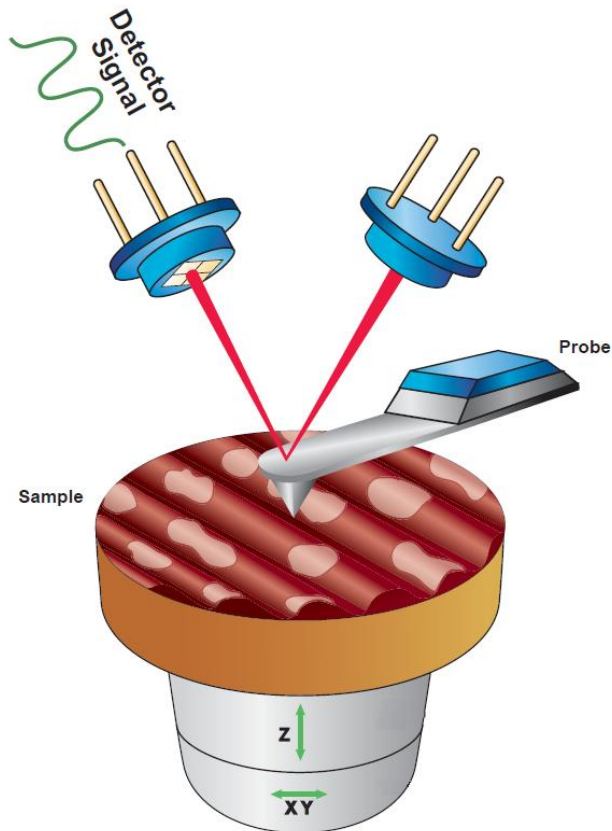


Figure 1: AFM Function. [Courtesy Bruker]

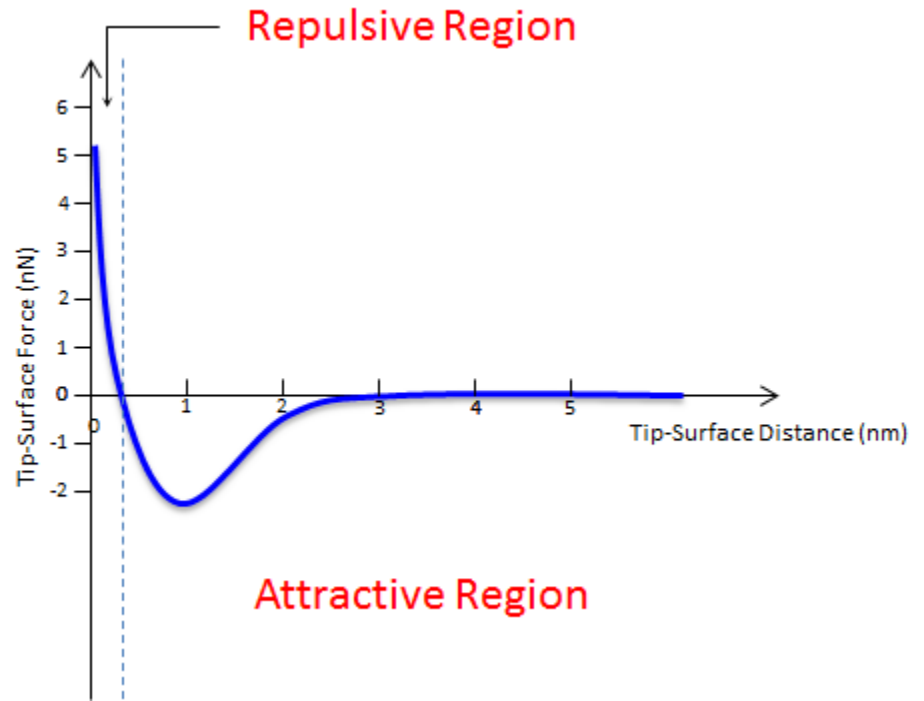
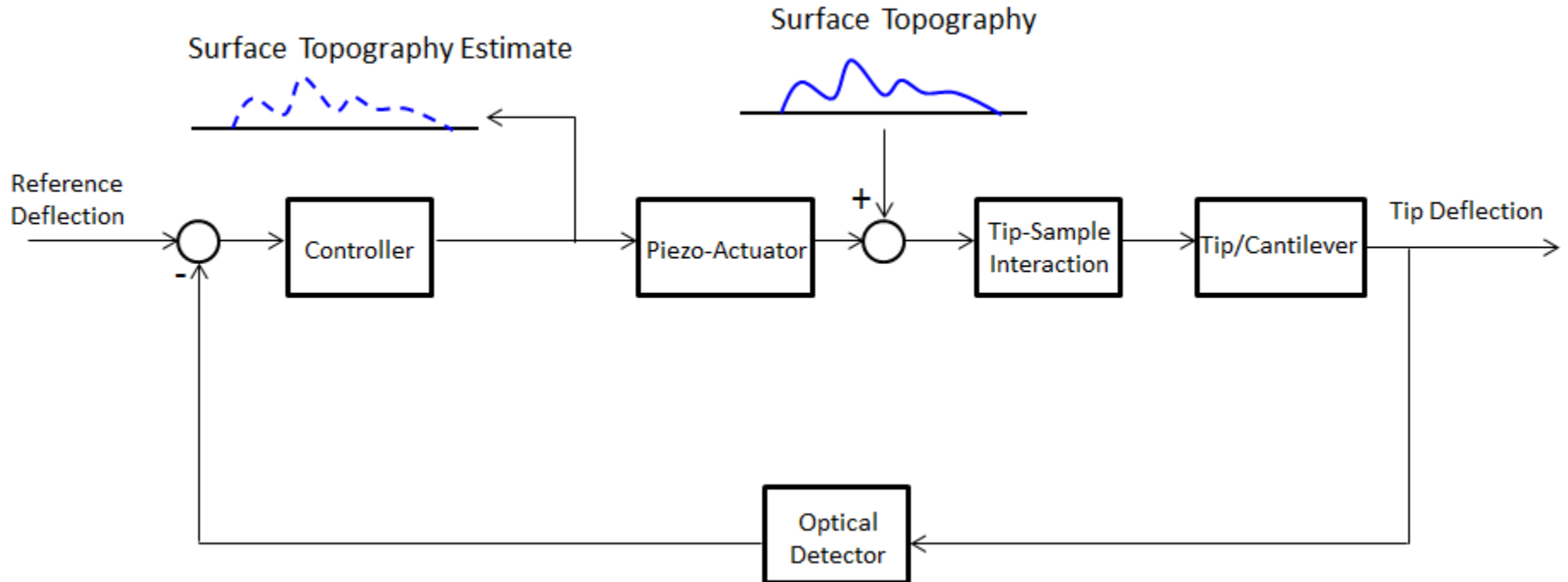
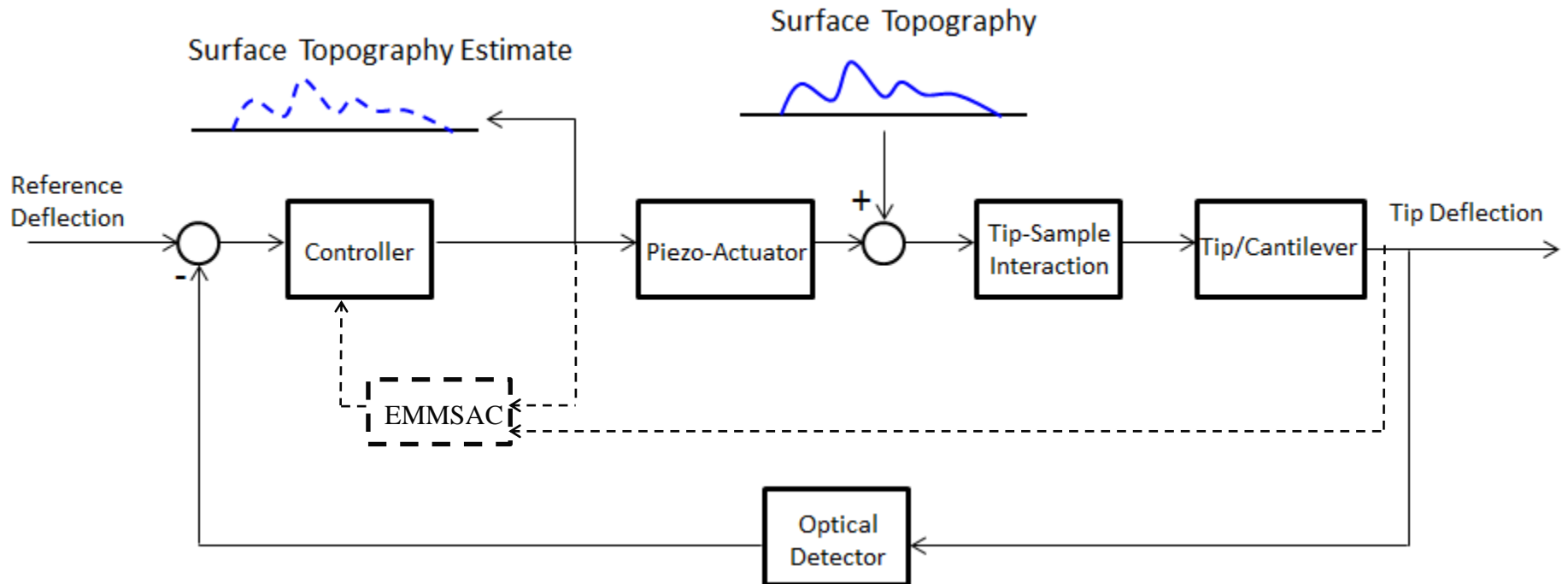


Figure 2: Tip sample interaction force.

AFM Control Loop



EMMSAC



Speedup Using Compressive Sensing

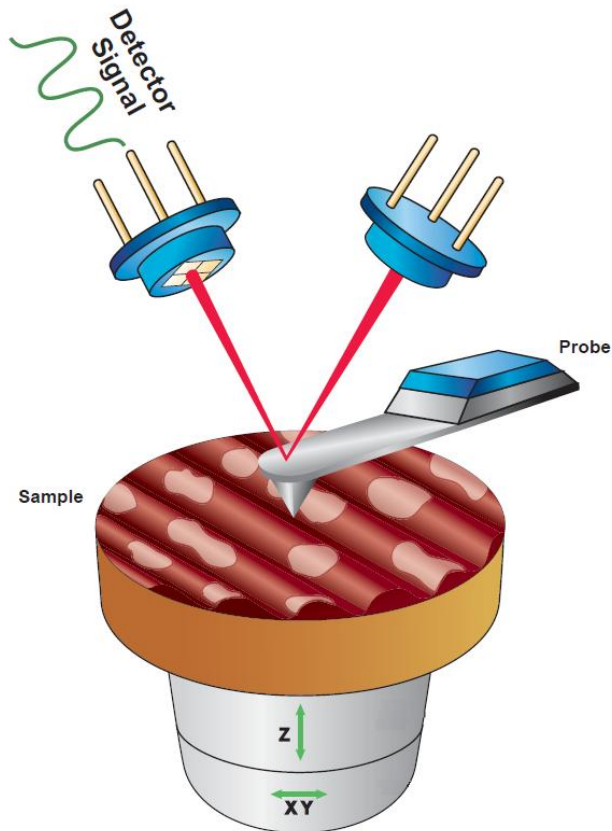
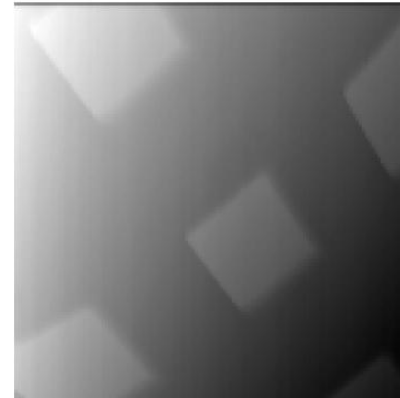


Figure 1: AFM Function. [Courtesy Bruker]

Original Image



Compressive Sensing Image

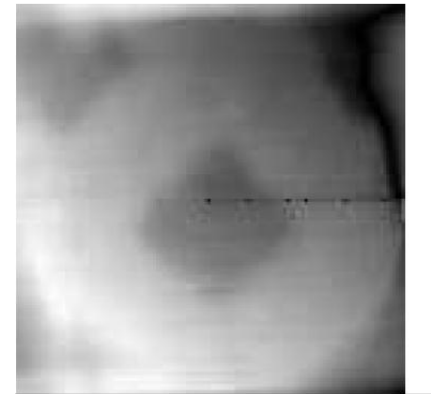


Figure 2: Image Comparison

Conclusion

- **Controller tuning effort**
 - *Possible solution using Estimation based Multiple Model Switched Adaptive Control (EMMSAC)*
- **Slow scan speed**
 - *Compressive sensing*