2.3 Microscopy: Exercises

Lecture 2&3: Instrumentation and Atomic Force Microscopy

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1. A basic 4f-Microscope system - revisited

Consider the microscope from last seminar‘s problem. We now use the Nikon objective (40x, NA=0.65) together with a Zeiss tube lens (f=165mm).
How do the results from last time change? What potential downsides can it have to mix vendors?

2. Atomic force microscopy

a) Describe how the tapping mode works and how the height image is generated. In the tapping mode it is possible to capture the “phase image” simultaneously. How does the phase imaging work and which influence do different surface properties (e.g. stiffness) have on this image?

b) You want to investigate how proteins adsorb on a model implant surface (titanium). Which AFM mode would you use and why?

c) Draw a typical Force-Distance curve for a tip approaching and withdrawing the polyethylene surface! What happens with the force-distance curve if the tip would be functionalized with a hydrophobic chemical?

Hint:
Search for relevant information on AFM online or in the university library.