

# Dip Pen Nanolithography

## Instructions for using DPN

1. Use ProScan software to take at least one scan. The DVM reading of more than 500 mV is ok for DPN. Larger the coating on the tip, lower will be the signal.
2. Make sure that Z center voltage is stable and in the center of the piezo bar. The same should be for probe signal.
3. Set scan size to 0.1  $\mu\text{m}$ , X and Y offset to  $-40 \mu\text{m}$ .
4. Turn the laser power off by clicking the icon just below the menu bar. The laser should be turned off before opening DPN software, otherwise the computer will hang up and you have to restart the system again.
5. Minimize the ProScan and open the DPN software by clicking on its icon on the desktop.
6. **The computer run very slowly in DPN writing process, so please be patience and never click on any icons while it is running.** Sometimes, it may take up to several minutes.
7. It is better to calibrate the diffusion coefficient for your ink for better results. **See DPN manual for details of DPN writing and calibration.**
8. Once DPN start writing, the laser power will be automatically switched on.
9. Once finished with DPN writing, image the sample in DPM software itself. You can only get LFM image in DPN and it will be black and white.
10. For imaging in DPN, click on Ink Cal icon  $\rightarrow$  Capture. The image displayed on CCD monitor will be captured.
11. Click on SPM and then image. Do not engage at this point as tip is already in contact. Use the same offset and scan size that was displayed during DPN writing protocol menu.
12. Never click on the emergency stop. The software will hang up.
13. ProScan can also be used for looking at the patterns written in DPN.
14. Before switching to ProScan, release the AFM by clicking on its icon. Watch out for green light in the bottom of the screen. It might take some seconds at this point.
15. Switch on the laser power again.
16. Open the Proscan again and set the scan size and offsets. Select both topography and LFM and start imaging.
17. Going back in DPN required the same procedure as you started for first time.
18. If you have any questions, please feel free to ask **NIFTI manager**.