

# CO adsorbed on Mn/W(001)

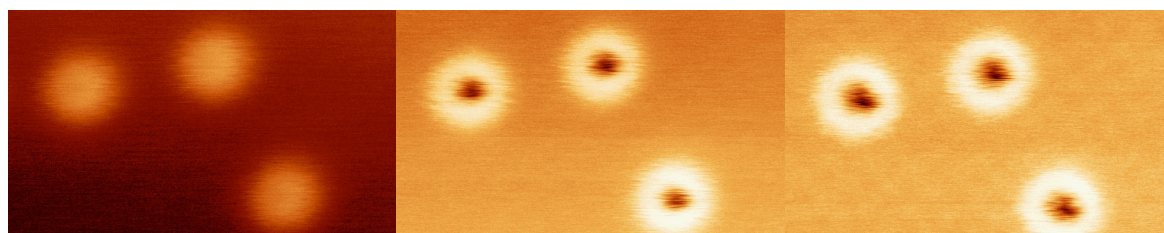
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CO molecules have received a lot of attention in combined AFM/STM studies lately, as they have been used to probe both organic molecules with spectacular submolecular resolution [1] as well as the crystallographic orientation of metallic tip apices [2].

When discussing the contrast, the electrostatic dipole of the CO has been neglected so far. Evidence gathered with metallic tip, which should always exhibit a dipole moment [3], on CO adsorbed on metallic and insulating substrates suggests that dipole-dipole-interaction in combination with van-der-Waals forces explain the different contrasts of CO changing from simple protusions to donut-like rings to deep depressions in the topography.

This contribution will focus on CO adsorbed on Mn/W(001), and how adsorption sites and different interaction forces during scanning alter the appearance of imaged CO molecules in non-contact AFM images.



**Figure 1:** Sequential constant  $\Delta f$  images of the same three CO molecules adsorbed on Mn/W(001) imaged at different tip sample distances (smaller separations from left to right).

## References

- [1] L. Gross, F. Mohn, N. Moll, P. Liljeroth and G. Meyer, *Science* **325**, (2009) 1110.
- [2] J. Welker and F. J. Giessibl, *Science* **336**, (2012) 444.
- [3] G. Teobaldi, K. Lämmle, T. Trevethan, M. Watkins, A. Schwarz, R. Wiesendanger, and A. Shluger, *Physical Review Letters* **106**, (2011) 216102.