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Atomic-resolution AFM imaging of single molecules FABIAN MOHN, LEO GROSS, NIKOLAJ MOLL, PETER LILJEROTH, GERHARD MEYER, IBM Research - Zurich, 8803 Rueschlikon, Switzerland — We have recently developed a technique, which enables imaging of individual ad molecules with atomic resolution using noncontact atomic force microscopy [L. Gross et al., Science 325, 1110 (2009)]. The key to achieving intramolecular contrast is a controlled functionalization of the microscope's tip apex. We compare the imaging capabilities of different tip terminations and present measurements of the distance dependence of the imaging contrast. These investigations - along with first- principle density functional theory calculations - indicate, that AFM operation in the regime of maximal attractive forces is crucial for achieving atomic contrast on molecules. Such close-distance operation is facilitated by using oscillation amplitudes in the sub-angstrom range.

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