

Abstract Submitted
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Surface based detection schemes for molecular interferometry experiments - implications and possible applications THOMAS JUFFMANN, ADRIANA MILIC, MICHAEL MUELLNERITSCH, MARKUS ARNDT, Univ. of Vienna - Faculty of Physics — Surface based detection schemes for molecular interferometry experiments [1] might be crucial in the search for the quantum properties of larger and larger objects [2] since they provide single particle sensitivity. Here we report on molecular interferograms of different biomolecules imaged using fluorescence microscopy. Being able to watch the build-up of an interferogram live and in situ reveals the matter-wave behavior of these complex molecules in an unprecedented way. We examine several problems encountered due to van-der-Waals forces between the molecules and the diffraction grating and discuss possible ways to circumvent these. Especially the advent of ultra-thin (1-100 atomic layers) diffraction masks might path the way towards molecular holography. We also discuss other possible applications such as coherent molecular microscopy.

[1] T. Juffmann, S. Truppe, P. Geyer, A.G. Major, S. Deachapunya, H. Ulbricht, M. Arndt, *Phys. Rev. Lett.* 103, 263601 (2009).

[2] T. Juffmann, S. Nimmrichter, M. Arndt, H. Gleiter, K.Hornberger, in print, *Foundations of Physics*.

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