

Surface Action Spectroscopy with Inert Gas Messenger Atoms

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Action spectroscopy is well established in the field of cluster physics and chemistry, where sample densities are very low. The action spectroscopy approach is based on the idea, that messenger species are attached to the object under investigation, and that laser light of varying frequency in the infrared is used to detach the messengers, which are detected with a mass-spectrometer. By varying the infrared frequency, one is able to record the vibrational spectrum of the object under study without having to record a reference spectrum. It has not been applied to surfaces due to the need for high intensity frequency variable laser sources. On the other hand, desorption induced by electronic transition as well as photo-desorption are well established fields surface science. We have over the last few years developed surface action spectroscopy employing the Free Electron Laser installed at the Fritz-Haber Institute. In the presentation I report on the conceptual design and some first results on surface vibrational spectroscopy using the approach (1-3), as well as the pros and cons of the techniques in comparison to other vibrational spectroscopy techniques (4).

References:

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