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To whom it may concern

Evaluation of the habilitation thesis of Dr Pavel Jelinek

The work of Pavel Jelinek in the past years focussed on high-resolution imaging with scanning probe microscopy. In particular he studied atomic resolution of molecules using functionalized tips with scanning tunnelling microscopy (STM), non-contact atomic force microscopy (NC-AFM) and inelastic electron tunnelling spectroscopy (IETS). He and his group made seminal contributions to the field and can he be regarded as one of the main players in our community.

Pavel Jelinek is known in the whole community for the probe particle model, which he introduced together with his PhD student Prokop Hapala [Phys. Rev. B, 2014, 90, 085421 and Phys. Rev. Lett. 2014, 113, 226101]. Now most of the community uses their model. Many groups collaborate with Pavel Jelinek for the interpretation and simulation of high-resolution AFM, STM and IESTS images on molecules; or (as my own group) use their model that they made openly available. Jelinek's group not only provided a tool to simulate images, but moreover, they invented analysis schemes and theory to extract additional information exploiting the insights they gained about the imaging mechanism. In particular they demonstrated how electric fields could be obtained using the distortion of images that result from the tilting of tips due to electrostatic interactions [Nature Comm., 2016, 7, 11560].

Pavel Jelinek also contributed substantially to the interpretation of high-resolution Kelvin Probe Force Microscopy (KPFM) and advanced this method. In a joint study with Jascha Repp's group from Regensburg they introduced a novel force spectroscopy technique which allows one to better disentangle electrostatic from other contributions. Applying this technique they resolved contrast variations along individual polar bonds [Phys. Rev. Lett., 2015, 115, 076101].

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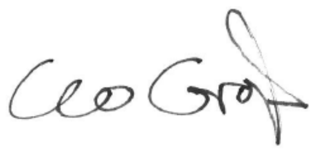
Pavel Jelinek not only became one of the most important theoreticians in the field of AFM and STM, but he also started to design and carry out experiments himself. The most recent highlight of his work is the investigation of on-surface chemistry of chiral molecules. In a recent study performed by O. Stetsovych et al., a homochiral [7]helicene derivative was planarized by on-surface synthesis. Using AFM, the intermediates and products could be identified and it turned out that prochiral adsorbates with a pronounced non-racemic ratio were formed on-surface. Thus, the chirality of the enantiomerically pure helicene was transferred into a preferred adsorbate handedness of the prochiral molecule formed [Nature Chem. 2017, 9, 213]. The design of the experiment is creative and great, the measured data is of the highest quality and by the way establishes the Kolibri sensor for high resolution imaging. And finally the outcome and findings of the experiment are unexpected and exciting. It will inspire chemist working in stereochemistry and our community that at the moment is highly interested in understanding and improving on-surface chemistry reactions.

Another highlight is the work he carried out together with the group of Y. Sugimoto, in which they demonstrated atomic resolution by AFM on molecules at room temperature for the first time [Nature Comm. 2015, 6, 7766], an highly important breakthrough towards a wider applicability of high-resolution AFM.

In addition to his demonstrated scientific excellence, Pavel Jelinek is a very good speaker and can excellently convey his results and insights. He creates enthusiasm for physics, chemistry and his research and inspires students. I fully support the habilitation of Dr Pavel Jelinek.

Sincerely,



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