



Department of Physics

Spring 2019

Colloquia

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An atomic-scale view on oxide surfaces

Our understanding of metal oxides has benefitted tremendously from the application of surface science techniques. Particularly useful has been Scanning Probe Microscopy, which allows to directly inspect, and even manipulate, atomic-size defects and defect-related surface chemistry. Equally important has been the development of suitable model systems, i.e., (ultra)thin films and well-prepared oxide single crystals that allow a reliable experimental and theoretical modeling with crisp and unequivocal insights into fundamental processes and mechanisms.

In the talk, recent developments in the field will be illustrated by examples including our group's recent research results on binary and ternary metal oxides [1-4]. Emphasis will be laid on giving an overview of different aspects, such as the importance of the relationship between bulk and surface defects [5], the opportunities and the challenges of extending surface science to more complex materials and to high-pressure and aqueous environments [6].

Ulrike Diebold received her PhD degree in engineering physics in 1990 from the University of Technology (TU Wien) in Vienna, Austria. After working as a post-doc with Prof. Ted Madey at Rutgers University in New Jersey, she joined the faculty at Tulane University, New Orleans, U.S.A. In 2010 she returned to her alma mater, where she currently holds a full professorship at the Institute of Applied Physics.

Diebold conducts research in experimental surface science with an emphasis on metal oxide surfaces. She is particularly interested in the atomic-scale properties of these complex materials, and in unraveling their (defect)structure/reactivity relationship. The main tool, Scanning Probe Microscopy, is complemented by area-averaging surface spectroscopies and first-principles calculations.

Diebold has published more than 200 peer-reviewed articles, and has given over 300 invited talks. Her articles have been cited more than 20,000 times. She has been elected a Fellow of AVS, APS, and AAAS, and is a member of the Austrian, German, and European Academies of Sciences. She is also a recipient of several international awards, including an Advanced Research Grant from the European Research Council (ERC), the Adamson Award of the American Chemical Society, and the Wittgenstein Prize, the highest research award in Austria.



May 8
Wednesday



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15:40

References:

- [1] R. Bliem, et al., Science, Chemie Intl. Ed., 346, 1212 (2014)
- [2] D. Halwiel, et al., Nature Mater., 15, 450 (2016)
- [3] M. Setvin, et al., Proc. Natl. Acad. Sci., 114 E2556 (2017)
- [4] M. Setvin, et al., Science, 359, 572 (2018)
- [5] M. Setvin, et al., Chem. Soc. Rev. 46, 1772 (2017)
- [6] J. Balajka, et al., Science 361, 786 (2018)

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