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## Observations of pre- and post-breakdown structures on OFHC Cu surfaces

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Numerous devices featuring diverse applications contain metal that is exposed to high electric fields and operate under a vacuum. At high electric fields, an occurrence of plasma formation inside the vacuum can lead to breakdown [BD] and failure of the device. Despite the fact that the detailed mechanisms controlling BD have been the subject of extensive study for the past several decades, currently the nature of BD formation remains elusive. However, through an examination of the features caused by the BD process we can gain a better grasp of the phenomenon in an attempt to find its root causes. Craters are the most characteristic feature of BD; other features can also be found on the surface, both in regions distant from craters as well as in close proximity to them. These other features include dendritic arms, depressions, “step-like” features, and splashes of melted copper. In order to discern which features were created in pre-BD as opposed to post-BD, we are working to distinguish between features that were created as a byproduct of crater formation, and those which came into existence independently of crater formation. Such a distinction can play a critical role in paving the way towards an understanding of the mechanisms behind BD, and thereby help in reducing the rate of BD occurrence, which in turn can lessen the damage caused to the material and consequently increase the substrate’s lifetime.

### Type of contribution

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### session

Experiments and Diagnostics

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