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Study on ”charge speckle” phenomenon of charge accumulation on Polymer Insulator Surface

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Abstract: Charge accumulation on the surface of polymer insulators under DC voltage usually presents two different distribution characteristics, which can be called “dominant pattern” and “charge speckle” pattern respectively. Under “dominant pattern”, the charge distribution is uniform and the polarity is the same as the applied voltage; However, the charge density of “charge speckle “is obviously different from the surrounding region, and the charge polarity may be the same as the applied voltage polarity or the opposite. Firstly, the charge accumulation mechanism of the “charge speckle” pattern is different from that of the “dominant pattern”, which can’t reflect the essential characteristics of the charge accumulation of insulating materials. Secondly, the “charge speckle” may has a serious effect on the distortion of the surface electric field and reduce flashover voltage along the surface, so it needs to be studied specially. Based on theoretical analysis and experimental methods, the causes and characteristics of “charge speckle” pattern on insulating materials under different conditions are studied, and corresponding measures are put forward to reduce the influence of “charge speckle”.
Keywords: DC voltage; polymer; Charge accumulation; Dominant pattern; charge speckle; GIL
References: Zhang B., Gao W., Qi Z., Wang Q., and Zhang G., IEEE Transactions on Instrumentation and Measurement (2017), 66, 3316-3326.

Dayu Li1 , Yicen Hou1 , Boya Zhang1 , Wenqiang Gao1 , Guixin Zhang1*1 Department of Electrical Engineering, Tsinghua University, Beijing, 100084, China*Corresponding author’s e-mail: guixin@mail.tsinghua.edu.cn

Author: DAYU, Li

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