Contribution ID: **216** Type: **Oral Presentation**

INVESTIGATION ON INITIATION AND DEVELOPMENT OF VACUUM FLASHOVER ACROSS SOLID INSULATION

Wednesday 6 June 2018 16:45 (15 minutes)

Guan-Jun Zhang, Run-Dong Zhou, Guang-Yu Sun, Bao-Hong Guo, Bai-Peng Song, Zheng-Shi Chang, Hai-Bao Mu
State Key Laboratory of Electrical Insulation and Power Equipment,
School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, Shaanxi 710049, China

Surface flashover across solid insulation in vacuum is a great limitation of many electrical and electronic systems, since it typically takes place on the surface region of insulating material at applied electric stress much lower than the bulk breakdown strength of the material. This paper experimentally studies the initiation and development process of flashover across solid insulation under pulsed voltage in vacuum. It is observed that discharge initiation is greatly affected by local electric field at both cathode triple junction (CTJ) and anode triple junction (ATJ). The flashover phenomena transfer from cathode-initiated to anode-initiated as the electric field at ATJ is increased, i.e., flashover is generally initiated from CTJ, and when the field at ATJ is too much stronger than that at CTJ, the flashover would be initiated from ATJ. However, the ATJ discharge is restricted and hardly directly develops toward cathode, and the final breakdown happens only when CTJ discharge is triggered by the ATJ discharge. The flashover characteristic results suggests that the withstand voltage of anode-initiated flashover is higher than that of cathode-initiated flashover. However, a too strong field at ATJ would lead to the decreasing of flashover voltage. A competitive model is proposed to describe the relationship between the flashover initiation and development and the different electric field configuration. It is practically useful to greatly improve insulation withstand performance by optimizing local electric field, i.e., appropriately increasing the ATJ field and reducing the CTJ field to make flashover occur in a critical state between the cathode-initiated and anode-initiated discharge.

Authors: Prof. ZHANG, Guan-Jun (Xi'an Jiaotong University); ZHOU, Run-Dong (Xi'an Jiaotong University); SUN, Guang-Yu (Xi'an Jiaotong University); GUO, Bao-Hong (Xi'an Jiaotong University); SONG, Bai-peng (State Key Laboratory of Electrical Insulation and Power Equipment, School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, Shaanxi 710049, China); CHANG, Zheng-Shi (Xi'an Jiaotong University); MU, Hai-Bao (Xi'an Jiaotong University)

Presenter: Prof. ZHANG, Guan-Jun (Xi'an Jiaotong University)

Session Classification: Oral 11 - Partial Discharges & Plasmas