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**THE DYNAMIC BEHAVIOR OF SPACE CHARGES IN THE PRESENCE OF WATER TREES GROWING FROM THE SEMICONDUCTOR LAYERS OF A MEDIUM VOLTAGE CABLE**

## Abstracts

This paper deals with the investigation of the influence of presence of space charges and water trees growing from the two semiconducting layers, interior and exterior of polymeric insulation used in the medium voltage cables, on the basis of numerical method results using Comsol Multiphysics. The results of investigation showed that, the presence of water trees and accumulation of the space charges induce a significant variation of electric field in the insulation. The electric field decreases in a remarkable way in the vicinity of the interior semiconductor layer while it increases significantly in the vicinity of the external semiconductor layer. This distribution of the electric field depends on both the length and the permittivity of water trees developed in the cable insulation, as well as on the magnitude of the space charge accumulated and their dynamic movement in the insulation with defects. Consequently, the intensification of the electric field close to the semiconducting layers facilitates the process of generating electrical tree and leads to premature breakdown. Furthermore, the initiation of electric trees is more probable in the case of water trees growing from outer semiconductor layer than in the case of water trees growing from inner semiconductor layer.

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More Informations :

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