Contribution ID: **193** Type: **Poster Presentation**

Separation of Mixed PD UHF Signals in GIS by Using Cumulative Energy Function Feature Extraction

Friday 8 July 2016 13:30 (20 minutes)

ABSTRACT: Multiple PD sources may occur simultaneously in power equipment, and cause the interpretation problems such as pattern recognition and risk assessment. The separation of mixed signals is of importance for reliable interpretation. The separation features in most of the methods are with fixed mathematical equations, which may not applicable to the variable experimental conditions such as power equipment, measurement circuit and coupler performance. In this paper, a mixed PD signals separation algorithm based on feature optimization extraction of cumulative energy function is proposed. Cumulative energy functions in time domain (TCE) and frequency domain (FCE) are calculated to characterize the PD waveforms and their FFT spectrums, respectively. Mathematical morphology gradient (MMG) operation is applied to the TCE and FCE, and the energy rising steepness features are extracted. The standard deviation of extracted features is adopted to evaluate their separation performance. In order to obtain effective separation results for various experimental conditions, the length of structure element in MMG is optimized with the goal of maximum separation performance. Experiments on three multi-defect models in a GIS are performed, and the separation performance of the proposed algorithm is tested with the acquired mixed UHF signals. Finally, the separation algorithm is successfully applied to the separation of UHF signals detected from an on-site 1100kV GIS multiple PD UHF signals. The separation results indicate that the proposed method is effective for both internal and external sensors, and the method shows robust performance for UHF signals separation.
KEY WORDS：gas insulated switchgear, partial discharge detection, signal separation, cumulative energy, feature optimization extraction

Author: Dr SHAO, Xianjun (Research Institute of State Grid Zhejiang Electric Power Company; State Key Lab of Electrical Insulation and Power Equipment, Xi'an Jiaotong University)

Co-authors: Mr WANG, Shaoan (Research Institute of State Grid Zhejiang Electric Power Company); Mr HE, Wenlin (Research Institute of State Grid Zhejiang Electric Power Company)

Presenter: Dr SHAO, Xianjun (Research Institute of State Grid Zhejiang Electric Power Company; State Key Lab of Electrical Insulation and Power Equipment, Xi'an Jiaotong University)

Session Classification: Poster 3-C

Track Classification: High Voltage Design, Devices, Testing, and Diagnostics