



Contribution ID: 137

Type: Oral

## Partial Discharge in High Voltage DC Cables

*Wednesday 21 June 2017 12:15 (15 minutes)*

This paper is concerned with use of partial discharge monitoring to provide information about the condition of the insulation of electrical cables used for HVDC transmission systems. Electrical cables are among the most fundamental components of any electrical grid, from large subsea international interconnectors, to the 'last mile' providing consumers with their electrical supply. The size, cost and current carrying capability are the main considerations when designing and selecting a cable, and in this regard the insulation of these cables is as fundamental as the conductor. Partial discharge (PD) measurement is becoming increasingly vital in monitoring the condition of cable insulation, providing valuable information about the health of the insulation, and predicting when insulation is likely to fail. The majority of this PD monitoring is performed on cable operating under AC conditions, however, with the increasing use of high voltage DC links, for subsea, or long land-based connections provides motivation for the increased use of PD monitoring on cables operating under HVDC. However, despite the increased intensity of research into PD in HVDC cables, there are significant knowledge gaps, preventing the practical application of PD monitoring techniques to HVDC cables. This paper seeks to partially address these gaps in knowledge, by presenting results obtained from PD measurements on artificial voids created in polymeric cable insulation under both AC and DC conditions. From this, recommendations on the use of PD monitoring for HVDC cables may be provided, as well as potentially recommendations for future research at both an academic and industrial level.

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**Session Classification:** Oral session 13 - High-Voltage Insulation and Dielectric Breakdown Phenomena, Explosively-Driven Pulsed Power - Session Chair : Yakov Krasik

**Track Classification:** Pulsed Power Physics and Technology, Components and HV Insulation