

Space charge measuring system by Probe assembly on ground side with piezo-PWP method

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Introduction

It is commonly reported that space charge accumulation under long-term DC condition could produce serious electric field distortion in polymeric materials and dramatically affect its electrical performance, especially XLPE, the main insulation material of HVDC cables [1]. Thus, the measurement of space charge distribution is essential [2].

The traditional PWP method, widely used for space charge measuring, usually extracts signals from the high-voltage side, which greatly reduces the operating safety. And it also has the limitations of large equipment volume and high cost [3-4].

Results and Discussion

Recently, a new measurement scheme that extracts signals from the ground side was proposed, which fundamentally overcomes the drawback of high risk of taking signals from the high-voltage side in the traditional scheme.

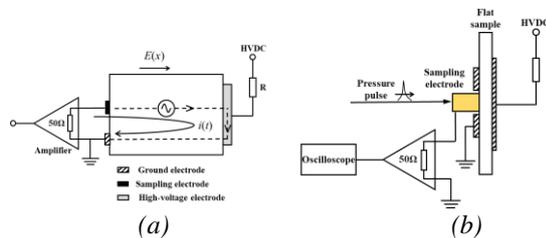


Figure 1: Current loop of signal measured from ground side (a) and schematic diagram of measurement principle (b)

Based on the above measuring principle, a portable system for space charge distribution is built, as is shown in Fig. 2. The key device of new measurement system is the probe assembly, which is the combination of pressure pulse generation and the electrode of measuring signal.

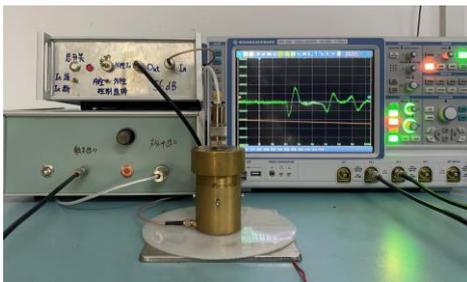


Figure 2: Platform for independent measurement

The experiments were performed on the same sample, and some typical signal obtained is shown in Figure 3.

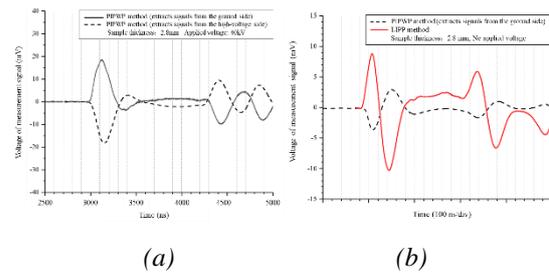


Figure 3: Compared with the traditional Piezo-PWP method (a) and Laser-PWP method (b)

Conclusion

In summary, the new system can be used to measure the space charge in the ground electrode, be as a intendent and the portable meter. Compared with the traditional Piezo-PWP method and Laser-PWP method, the new system has a similar spatial resolution.

References

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