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Kerr Electric-Optic Measurement of Electric Field and Space Charge Distribution in High Voltage Pulsed Transformer Oil

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Abstract : Transformer oil is widely used in power systems because of its excellent insulation properties. The accurate measurement of electric field and space charge distribution in transformer oil under high voltage impulse has important theoretical and practical significance, but still remains challenging to date because of its low Kerr constant. In this study, the continuous electric field and space charge distribution over time between parallel-plate electrodes in high-voltage pulsed transformer oil based on the Kerr effect is directly measured using a linear array photoelectrical detector. Experimental results demonstrate the applicability and reliability of this method. This study provides a feasible approach to further study the space charge effects and breakdown mechanisms in transformer oil.

Keywords : electric field, Kerr, space charge, transformer oil
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