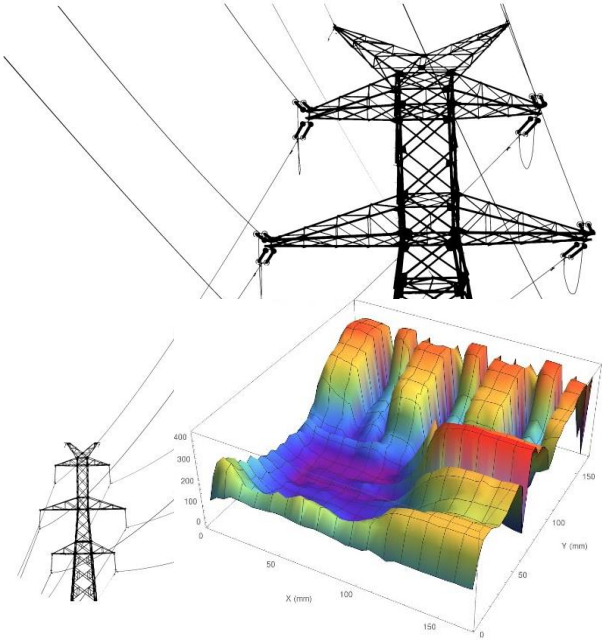
Context

In the medium and high voltage systems, insulation is of a great concern. To ensure this correct insulation in the long run, the electric field must be well understood and monitored.
Numerical simulations are quite relevant and accurate but inefficient when environmental conditions must be taken into account like humidity, dust, ice, pollutions...
The E-field measurement is required in order to determine the actual behavious of devices under test, sometimes under several tens of kV.
The E-field measurement associated to high voltage devces is not limites to insulation analysis. Indeed other applications can be addressed: exposition of people (SAR), partial/total discharges characterisation, EMC investigations...



Existing technical electrical measurement

For analysis or monitoring the line infrastructure, resistive or capacitive bridges are mainly used. The drawbacks of such technics involve expensive solutions, important setup time, safety issues.

For the measurement of human exposure, there are measuring devices with metal antenna from the ground which give an effective value of the E-field:

- Impact on the measurement
- No rigorous vector electric field

Proposed solution by Kapteos

The electro-optic solution presents the best possible measurement system thanks to:

- A non-invasive measurement (no metal part)
- A wide frequency range from 30 Hz to several GHz
- A fully insulated probe (fibre optic link)
- An operating temperature from 0 to +50°C for the probe
- The vector measurement of the E- field with excellent spatial resolution
- The same system for normal operation and for defects detection (dynamic range greater than 130 dB)

Targeted markets

Any manufacturer of medium, high voltage systems or components that wishes to ensure insulation design or understand components breakdowns:

- Transport of energy
- Insulators
- Cables
- Transformers
- Switch-gears
- Sub-stations
- And many more

Customer advantages of using Kapteos solution

The Kapteos solution enables high detailed analysis of the raised issues.
The customer can therefore understand accurately the situation and at a reduced cost, in order to take actions for improvements or corrections.

Kapteos references

- 25kV cable degradation analysis (SNCF)
- Electric field mapping of a 25kV insulator with partial discharges analysis (UQAC)
- Analysis of partial and total discharges of a medium voltage system (EDF)
- EMC analysis of switch-gear under 25kV ac (Sécheron)

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