

## Academia/Industry collaboration for the development of PD recognition tool

SC D1

PS1 Q6 Would industry and academia working together  
more closely lead to new or improved algorithms ?

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# Context and objectives of developed tool

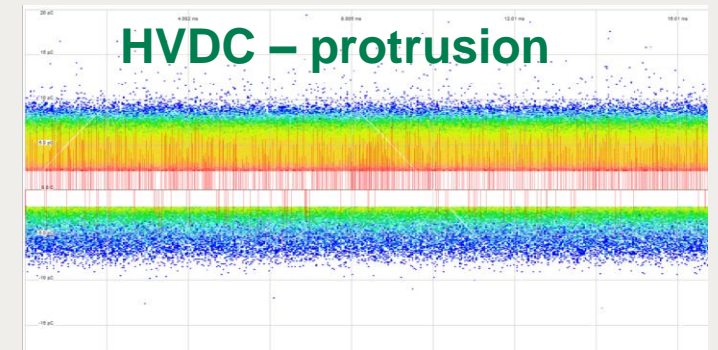
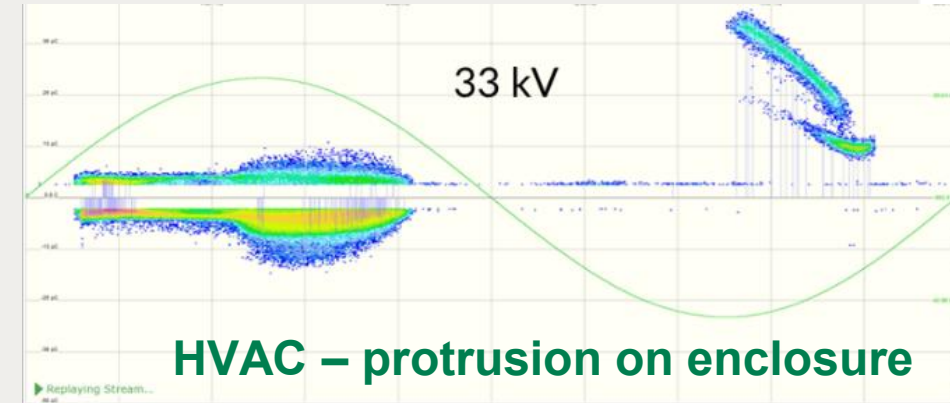
## • Context

- Diagnostic methods continuously improved but mainly for HVAC
- Development of HVDC lines and MTDC grids
- ⇒ Need of diagnostic methods for HVDC but only early stages for now and so require new research
- ⇒ Collaboration with Artificial Intelligence & Electrical engineering academic researchers from Ampere laboratory

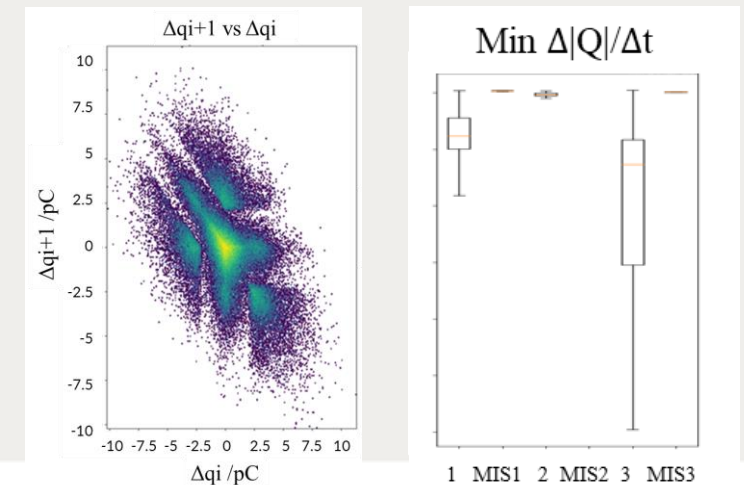
## • Objective

- Development of new diagnostic methods
- Development of a diagnostic tool compatible with both HVAC and HVDC systems

Group Discussion Meeting



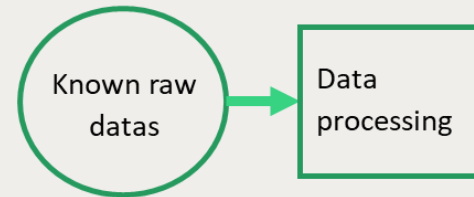
HVDC



## Developed tool in collaboration with academics

- **Data processing :**

- Sequences of time, amplitude and voltage
- With different types of sensor, on several defects

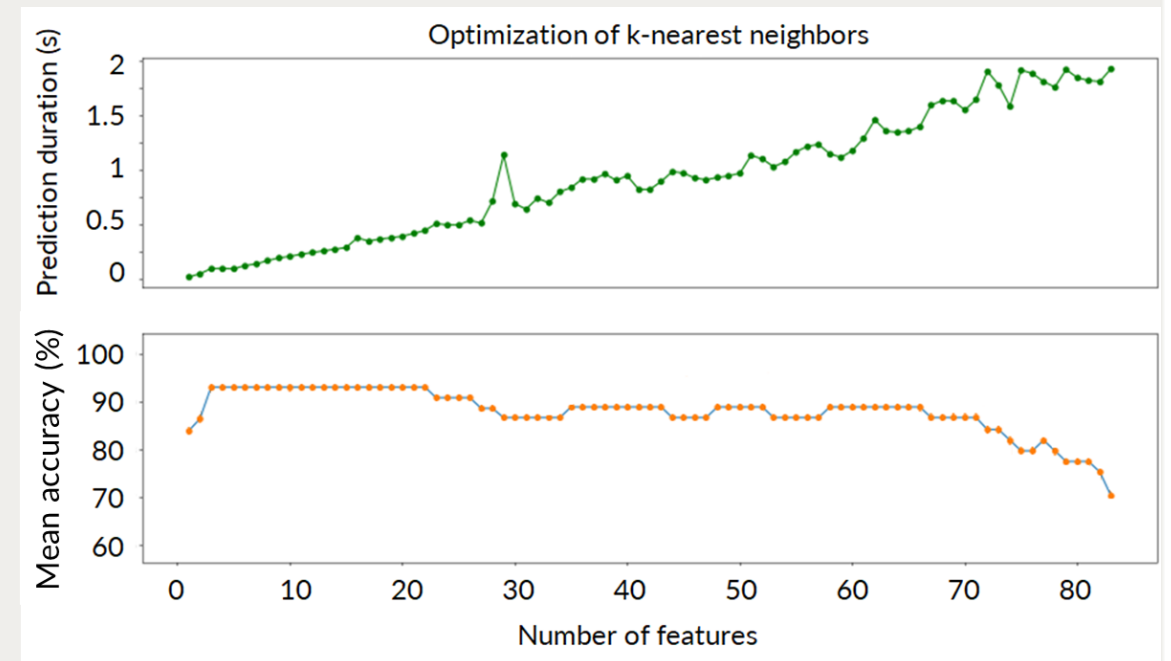


- **Training of classifier**

- Application of training on selected classifier : k-nearest neighbors, support vectors, random forest ...
- Optimization : quantities & type of parameters selected, values of hyperparameters of classifier

- **Recognition on unknown defects**

Group Discussion Meeting



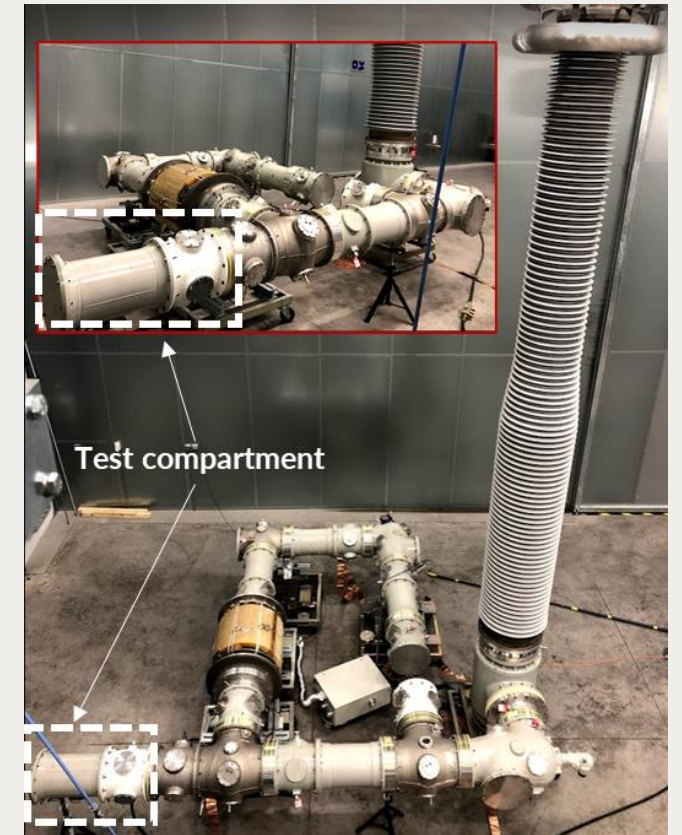
# Application to HVDC GIS using experimental data

- **Data**

- Real GIS
- 3 different defects

Defect type/class	Samples
floating-moving particle	5924
Particle on insulator	291
Protrusion	2249

Predicted \ True	floating-moving particle	Particle on insulator	Protrusion	Accuracy
floating-moving particle	3551	6	2	99,8%
Particle on insulator	2	167	1	98,2%
Protrusion	1	3	1346	99,7%



- **Results**

- For 40% learning/ 60% validation
- With more than 8000 samples
- Very high accuracy (>98 %)

## Conclusion

Would industry and academia working together more closely lead to new or improved algorithms?

Yes, academic/industry collaboration can lead to improved algorithm for instance, for new diagnostic methods.

These collaborations allow:

- Academics to access testing platform and on-site measurement
- Manufacturers to get insight of state-of-the-art findings of research