

## Student project proposal

### *Project title*

Waveform-based fault locator

### *Project type*



MSc thesis



BA semester project



MSc semester project

### *Project responsible and e-mail*

Mayank Nagendran – [mayank.nagendran@zaphiro.ch](mailto:mayank.nagendran@zaphiro.ch)

### *Project description*

Zaphiro would like to explore the state of the art of fault location using point-on-wave measurements. As a pioneer in PMU technology in distribution grids, we would like to explore the application of waveform-based approaches specifically for identifying and locating faults in distribution grids.

The objective of this project is to help augment the fault location solution with point-on-wave capabilities. This is helpful to clients as it enables new use cases like incipient fault detection and improvements to the accuracy of the current fault location.

Students will conduct a literature survey, identify the requirements for waveform-based fault location, the challenges for application to distribution grids along with a comparison of all the best techniques. The most suitable techniques are expected to be tested in an offline environment against waveforms collected from field installations as well as synthetic waveforms that can be generated to simulate any scenario of particular interest.

The objective of this project is flexible. Its content and the expected outcomes can be tailored to the project type (Semester or MSc thesis). This project is an opportunity to learn about the state of the art in fault location with a focus on medium voltage grids. Students will improve their understanding of how distribution utilities deal with faults and how this process can be improved by deploying additional monitoring devices.

### *Tasks of the student*

Literature survey with the following goals:

- Requirements to apply waveform-based fault location
- Comparison of available techniques
- Identify open challenges for application in distribution grids

## EPFL Distributed Electrical Systems Laboratory – DESL

Implementation in an offline tool of the most promising algorithms with comparison of the performance for the chosen set of waveforms and network types.

### *Requirements*

- Strong understanding of distribution grids, especially fault analysis
- Basic understanding of phasor estimation, synchrophasors and waveforms
- Knowledge of Python