# PhD Proposal 2016

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<td>Laboratory: IRCCYN</td>
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<td>Collaboration with other partner during this PhD:</td>
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**Title:** Observability and fault detection of power grid protections and state-estimation

**Scientific field:** Automation and Robotics.

**Key words:** robust estimation, grid protections, grid state-estimation

Details for the subject:
(Maximal length of 2 pages, including images, list of reference, ...The pdf file should not exceed 1Mo)

Background, Context:
Estimation and detection are important tasks for power systems. Indeed, these topics appear in several contexts:

- Detection of a distant fault or of a dysfunction of a power system in order to protect a local equipment. In this case a trip decision must be taken rapidly and by using thus only local information.
- Detection of a change of the operation conditions of the power grid in order to switch to an appropriate control mode
- Estimation of the state of the grid, i.e., computation of a coherent and realistic operation point of the whole power system using uncomplete or not fully reliable measures

Several dedicated estimation methods exist today (see, e.g., [1]). Most of them are approaches especially adapted to deal with the very large-scale of the interconnected power-systems. However, recent reflection motivated by the evolution of the power systems due mainly to the increased penetration of the renewable energies and new power electronic technologies brought the power systems researchers to the concept of smart sub-station. These new type of sub-station uses a maximum number of local information in order to allow decentralised data treatment and rapid decision. It is interesting to exploit in this new context the benefits of recent robust and adaptive observation techniques already used in other applications context [2]-[3].

References: