

PhD offer: Employment will start from September 2016 in Lyon France.

We are looking for highly motivated individuals interested in pursuing Ph.D. in collaboration with two Research labs.

AMPERE : Laboratoire de Génie Electrique de Lyon, Fr

LCIS : Laboratoire de Conception et d'Intégration des Systèmes à Valence, Fr

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The research topic focusses on power line communication through wire for applications in the area of DC energy distribution systems. The position also includes building communication prototype systems within distributed meshed DC-DC converter with a power bus of 400 DC. Each DC-DC converter will correspond to a node able to receive and transmit information through the DC network.

Context of the proposed PhD work:

The subject is a part of a research project to investigate the possibility of using a DC supply network instead of an AC electrical one. The proposed solution will allow an efficient use of the electrical resource and easier implementation of renewable system.

The candidate will work with the supervision of a team composed of members of the laboratory of electronic of Grenoble and members of the laboratory of electric system of Lyon where the experimental test will be carried on.

Title: Power Line communication design on DC supply bus for distributed power:

The technologies evolution has led to the emergence of new DC voltage power solutions like data centers' power DC supplies. The joint analysis between Ampere and LCIS laboratories exhibits the need for a robust communication protocol integrated in power modules for DC lines inter-connection. The proposed subject will determine an optimum adaptation interface and protocol for routing on DC bus network topology.

The state of art will analyse different power lines modulations whose spectral bandwidth varies (modulation ASK, FSK versus the OFDM technologies proposed in the "Home Plug Alliance" standardization). The objective is to design a communication module not necessarily with high throughput requirements (<1 Mbit / s) but with high reactivity between the elements to distribute and balance power to various elements (producers, consumers, switchers,). Different solutions will be evaluated to solve the DC elements synchronization. A centralized control in the master-slave model type will be compared with a decentralized approach, but synchronized for communications between the interconnected elements. The work should analyse electromagnetic compatibility and specific routing communications paths through the DC/DC converter modules. During the design process, the team should always take care to validate the technologies choice that might lead to an industrial development.

Keywords: communication through DC power line; meshed DC-DC converter node; DSP platform.

Minimum Academic level Requirement: Master or 5 years School of Engineer

Competences: Technical Competences:

Digital electronic; protocol communication, autonomous and embedded processor, wired digital signal transmission. Secondary competences: control of DC/DC power converter.

Net Salary: around 1400 E (possibility to improve the salary with teaching task).

Possibility to use the EU Glink ERASMUS MUNDUS project for mobility purpose (in that case, a grant of 1500E/month will be added to the salary for a 4 month mobility)