

## **PhD Position in Thermal Investigation of Buck-Boost Power Converters**

Research in power converters has been an intensive on-going effort at the Department of Energy Technology at Aalborg University (AAU/ET). Various aspects have been investigated including reliability, thermal, efficiency, topological design and applications. Related findings accumulated by the team at AAU/ET have been relevant to both the industry and academia.

To further excel in this area of research, a PhD project is planned whose purposes are to study thermal aspects of various buck-boost converters proposed recently, and develop solutions for improving their thermal flows. The project involves analytical work, simulation and experimental testing with suitably sized models and hardware power converters. The results obtained are expected to be impactful given the broad scope of applications of power converters.

The position is administered and funded by the "Science without Borders" program through the Brazilian Federal Agency for Support and Evaluation of Graduate Education (CAPES). The theme of focus related to the position is listed as "Engineering and Other Technological Areas" in the program. Acceptance of employment for the position is subject to the approval of grant from CAPES.

**Title:** Thermal Investigation of Buck-Boost Power Converters

**Hypothesis:** Power converters have many existing and expected future applications. Better understanding of their thermal aspects is likely to benefit their future design and development.

**Description:** Buck-boost converters are topologies designed with output voltages/currents that can step down or up freely. This capability is not demonstrated by typical voltage-source and current-source converters which subsequently prompts the development of buck-boost power converters. The development is however confined to topological aspects and seldom others like thermal considerations. It is thus of interest to study and compare their thermal performances which indirectly will affect their reliability and efficiency. Upon gaining the necessary understanding, methods aiming to improve thermal flows of power converters can be proposed and compared.

**Results:** 1) Models for identifying and quantifying possible thermal concerns in buck-boost power converters. 2) Methods for mitigating the identified concerns and hence improving the overall converter performances.

The PhD position is for the period from 2013 to 2016. The PhD student will be a member of a very strong research team at AAU/ET (approximately 80 PhD students in year 2012) working on power systems, power electronics or both. AAU/ET has a strong link with the industry, utility and academia, and has many on-going research programs in the general scope of power engineering.

Applicants for the PhD position should have a Master in Electrical Engineering with an emphasis on power semiconductors and electronics. Applicants should also preferably have some experience with engineering mathematics and thermal modelling. The language of communication at AAU/ET is English (written and spoken).

Further information can be obtained from Poh Chiang Loh at [pcloh@ieee.org](mailto:pcloh@ieee.org) or Professor Frede Blaabjerg, e-mail: [fbl@et.aau.dk](mailto:fbl@et.aau.dk)

**To apply please see the link below:**

<http://www.en.tek-nat.aau.dk/vacant+positions/Science+without+Borders/>

