

## SPECIAL SESSIONS

### Session Title

Power Quality Issues in Railway Traction Systems

### Abstract

Electrified transportation systems feature a variety of power systems (DC at different voltage levels, AC at different voltage level and frequency), and they increasingly make use of power electronic converters. The use of power converters has many advantages: more efficient use of energy, better driving performance and higher dynamics. However, it has also significant side effects: distortion of the power supply waveform, production of harmonics and interharmonics, increased reactive power demand.

The Power quality problems of electrified transportation systems are mainly related to the interaction among the power systems and the power electronics of the vehicles. A complex work is being developed concerning the analysis of grid and load response, such as instabilities and resonances, interface and mutual influence with transmission and distribution systems at higher voltage, characterization of rolling stock models and admittances, methods and strategies to gain an overall improvement of the whole system power quality. Moreover, the architecture of traction systems has also become more and more complex, and the bandwidth of on-board converters has increased. This ensure wider control and optimization margins, but requires a more careful and comprehensive approach.

Aim of this special session is to revisit the consolidated concepts of power quality in the light of new discoveries and research directions, in order to quantify the actual impact in terms of distortion, instability, losses and aging of the components of an electrified railway.

Finally yet importantly, a close analysis should be made on the normative aspects, whose development is made slow by the objectives difficulties of this kind of subjects, due to the interaction between different layers of the whole traction chain, from the power supply to the propulsion motor.

### Chair/(& Co-Chair if present)

Chair	Name	Philippe Ladoux
	Affiliation	LAPLACE Laboratory – University of Toulouse
	Email	philippe.ladoux@laplace.univ-tlse.fr
	Webpage/CV link/short bio	
Co-Chair	Name	Mauro Carpita
	Affiliation	University of Applied Sciences of Western Switzerland, Yverdon-les-Bains
	Email	mauro.carpita@heig-vd.ch
	Webpage/CV link/short bio	