

PhD thesis, Materials Science and Technology, Politecnico di Torino

PhD candidate: Stefano De La Pierre Des Ambrois

Tutor: Prof. Monica Ferraris

## **Advanced joined materials development and their shear strength evaluation for aerospace, energy and structural applications**

- Development of sandwich structures for aerospace applications:

Joining of CFRP honeycombs to glass-ceramic mirrors for satellites and other aerospace components. Joining material selection, characterization and optimization, based on the aerospace environment requirements. Scale-up of the joining process from small samples to large sandwich structures. Mechanical characterization of joined components with shear tests and tensile tests, before and after ageing in relevant conditions. Surface modification of the substrates to improve their joint strength.

- Torsion test: a method to measure the shear strength of joined components.

Torsion test of glass ceramic sealant materials for solid oxide fuel/electrolysis cells (SOFCs/SOECs), at room and application relevant temperatures. Torsion test of adhesively bonded steel, steel-to-glass and ceramic joined components for structural applications. Comparison between torsion test and other lap shear tests.

**Keywords:** Joining, Torsion test, Shear Strength, Sandwich Structure, Adhesive, Glass-ceramic.