

A multiscale investigation of the thermomechanical properties of carbon/carbon composites

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An important feature of Cf/C composites is their very low heat expansion coefficient. Combined to their light weight and outstanding high-temperature capabilities, this property turns them into key materials for solid rocket motor nozzles and divergents, for extreme thermal protection systems and for high-energy braking systems. From a design point of view, it is highly desirable to control the relationship between the material's structure and its behavior. This talk will present a coupled experimental/modeling approach featuring (i) determination of the heat expansion coefficient of the components, and (ii) in-situ high-temperature tests performed in a CT scanner associated to Digital Volume Correlation and compared to image-based modeling. The developed tools and the main results obtained with them will be presented and discussed in this talk.
