

On the role of in-plane damage mechanisms on the macroscopic behavior of SiC/SiC composites from complementary 2D and 3D in-situ investigations

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The mechanical behavior of architected SiC/SiC composites is driven by different damage mechanisms whose understanding is required for building micromechanics-based models able to reproduce and predict its complexity. The kinematics of the surface, precisely analyzed using DIC at the textile pattern scale, exhibit a fiber realignment unexplained by the cracks observed at the surface. The missing mechanism, tracked by tomography in-situ testing (SOLEIL synchrotron), appears to be in-plane microcracking which does not emerge at the free surface of the composite.