



3SR Seminars

06/11/26 at 10h30

Vito Rubino

Galilée room 015

Dynamic rupture behavior and friction evolution revealed by laboratory experiments using ultra high-speed digital image correlation

Shear cracks along interfaces are relevant to a broad class of engineering and geophysics applications, ranging from the failure of composite materials to earthquakes, landslides and avalanches. Characterizing the rheology of interfaces and faults is of paramount importance to improve our understanding of frictional ruptures, as friction controls key processes of rupture nucleation, propagation, and arrest and influences various rupture outcomes, for example how damaging earthquakes can be. In this presentation, I will discuss recent advances in the characterization of rupture behavior and friction evolution along both bare interfaces and interfaces with compressed granular materials. Such measurements are possible due to our recently developed imaging technique, based on digital image correlation (DIC) coupled with ultra-high-speed photography. One of the highlights of this new approach is its ability to experimentally capture the full-field evolution of particle velocities and strains of spontaneously propagating dynamic ruptures achieving a level of detail that was previously only possible through numerical simulations. Dynamic imaging of stresses enables us to decode the nature of friction by tracking its evolution and studying its dependence on slip, slip velocity and their history. The measured friction behavior allows us to challenge existing friction laws and formulate new ones. This approach gives a new perspective on the study of friction and provides important insights into earthquake and rupture physics with important implications for earthquake hazard assessment



Prof. Vito Rubino

