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Spectral element simulations of dynamic rupture along kinked faults

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Recent laboratory experiments on propagating cracks along kinked paths have shown that the rutpure velocity is strongly influenced by the slope of the secondary fault plane and the state of stress (Rousseau and Rosakis 2004), both for sub-Rayleigh and intersonic speeds.

Numerical simulations of such a process require high resolution of the frictional contact on the fault plane combined with geometrical flexibility to follow the slope change. For this reason, we use the Spectral Element method to analyze the nucleation and the propagation of the rutpure along kinks, as a function of the bending angle and the state of stress.

Comparisons with the experimental results will be shown and implications for earthquake rupture dynamics along non-planar fault systems will be discussed. This study was supported by the European SPICE project.