Stochastic Loewner evolution driven by Lévy processes ILIA RUSHKIN, University of Chicago, PANAGIOTIS OIKONOMOU, University of Chicago, LEO KADANOFF, University of Chicago, ILYA GRUZBERG, University of Chicago — Standard stochastic Loewner evolution (SLE) is driven by a continuous Brownian motion, which then produces a continuous fractal trace. If jumps are added to the driving function, the trace branches. We consider a generalized SLE driven by a superposition of a Brownian motion and a stable Lévy process. The situation is defined by the usual SLE parameter, $\kappa$, as well as $\alpha$ which defines the shape of the stable Lévy distribution. The resulting behavior is characterized by two descriptors: $p$, the probability that the trace self-intersects, and $\tilde{p}$, the probability that it will approach arbitrarily close to doing so. These descriptors are shown to change qualitatively and singularly at critical values of $\kappa$ and $\alpha$. These transitions occur as $\kappa$ passes through four (a well-known result) and as $\alpha$ passes through one (a new result). Numerical simulations are then used to explore the associated touching and near-touching events.

Ilia Rushkin
University of Chicago

Date submitted: 30 Nov 2005

Electronic form version 1.4