

# **A Statistical Multiple-Scattering Model of Small-Scale Fading in High-Speed Railway Cutting Scenarios**

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**Abstract:**

The fading statistics of wireless channel in the cutting scenario is characterized based on empirical measurements. A multiple scattering model called second-order scattering fading (SOSF) is used to model the small-scale fading. Statistical analysis of parameters for different fading subsets is presented. It is demonstrated that Rician fading is the dominant fading mechanism in cutting scenarios. The second scattering component can be observed which is negative correlated with the line-of-sight component. The transitions between different subset fading states is described by a hidden Markov process. The model is validated statistically by the measurement data in cuttings and can be extended to characterize small-scale fading in wideband communication system of high-speed railway since it can offer analytical estimation for different order multipath components.