Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Scaling laws for meandering streams KEITH MERTENS, University of North Carolina, VAKHTANG PUTKARADZE, Colorado State University, PETER VOROBIEFF, University of New Mexico — We report on the scaling laws associated with meandering of a rivulet flowing down a non-erodible, partially wetting incline. The meandering streams in this experiment are triggered by flow rate fluctuations and sustained by external noise forcing. In our experiments, the former is provided by an electronically controlled valve, and the latter is due to fluid droplets left on the surface by previous meanderings. Over the entire range of scales we observe, the averaged spectrum of the deviations of the stream from its centerline demonstrates a power-law scaling, thus precluding the possibility of a preferred wavelength in ongoing meandering. We derive a simple theoretical model of rivulet meandering from first principles, incorporating stream dynamics and external noise forcing. The model provides an accurate statistical description of the stream deviation from a non-meandering path.

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Date submitted: 02 Aug 2008 Electronic form version 1.4