



Stochastic modelling of turbulent wind fields

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A precise understanding and modelling of small-scale turbulent wind fields is important for the design and operation of modern wind power plants. For example, the design of rotor blades requires detailed knowledge of the wind field and its statistical properties. The control of single wind turbines as well as whole wind farms require the predictive modelling of the wind field.

We will present a stochastic model for the small-scale turbulent wind field. The model is based on a multifractal extension of fractional Brownian motion. It provides a consistent description of the statistics of the velocity field as well as the energy dissipation field. The modelled wind field represents a one-dimensional time series but can be extended to higher dimension straightforwardly.