The Field theory of avalanches

Kay Wiese*[1]

[1]Laboratoire de Physique Théorique de l'ENS (LPTENS) – CNRS : UMR8549, Université Pierre et Marie Curie (UPMC) - Paris VI, École normale supérieure [ENS] - Paris – 24 rue Lhomond, 75231 Paris CEDEX 05, France

Abstract

When elastic systems like contact lines on a rough substrate, domain walls in disordered magnets, or tectonic plates are driven slowly, they remain immobile most of the time, before responding with strong intermittent motion, termed avalanche. I will describe the field theory behind these phenomena, explain why its effective action has a cusp, and how such intricate objects as the temporal shape of an avalanche can be obtained. Finally, an exact mapping to the Manna sandpile model is discussed.

*Speaker