

Avalanches: durations, shapes, waiting times

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The picture we have of critical avalanching systems presents challenges like how to understand quantities that go beyond the usual descriptions in terms of probability distributions (“avalanche sizes”). I discuss recent work about other signatures of the universality class such as avalanche shapes [1] and the waiting times between subsequent avalanches [2].

Real-world systems such as dislocation plasticity or deformation avalanches [3] or compressional deformation (“woodquakes”) [4] present further challenges to the theory. This comes in terms of evidence of extended criticality and/or temporal correlations in the avalanching activity - which may be used for avalanche prediction.

[1] L. Laurson et al., Nat. Commun. 4, 2927 (2013).

[2] S. Janicevic et al., Inter-event correlations from avalanches hiding below the detection threshold, accepted for publication in Phys. Rev. Lett.

[3] A. Lehtinen et al., Phys. Rev. B94, 064101 (2016).

[4] T. Mäkinen et al., Phys. Rev. Lett. 115, 055501 (2015).