Popcorn: critical temperature, jump and sound - Supplementary Data

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Statistics

In the following, we report an elementary statistical analysis based on 24 jumps, which were successful among our 200 tests, in the sense that the succesful jumps were realised in the focal plane of the high-speed camera (depth of field $\simeq$ 3 mm). Experiments were performed in the conditions described in the Section 3 of the article.

The distribution of rotation angle θ is reported in figure S1. The mean value of θ is about 290° and there is a large proportion of rotation angles lower than 180° in our experiments. The experiment described in figure 2(a) of the article is for $\theta \simeq 490°$.

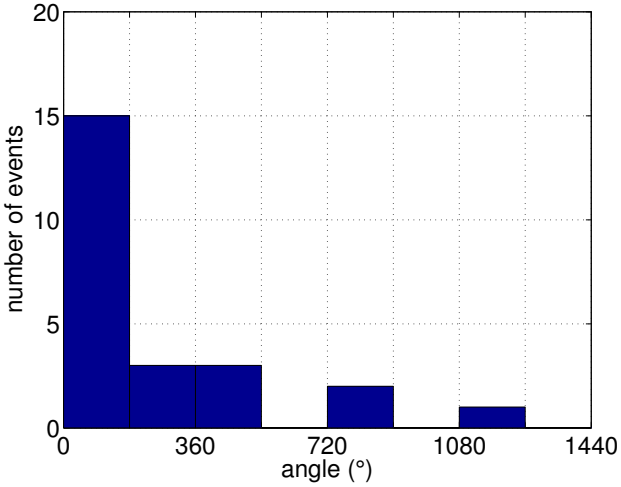

Fig. 1: Distribution of rotation angle θ (for 24 popcorn jumps).

The distribution of the parameter α, which is the ratio between the vertical kinetic energy and the total energy E_0, is reported in figure S2. Surprisingly, there is more jumps with $\alpha > 0.5$, meaning that the energy E_0 is generally converted for jumping vertically rather than for rotating. This would require further investigations about the position of the fracture and its incidence on jumps.

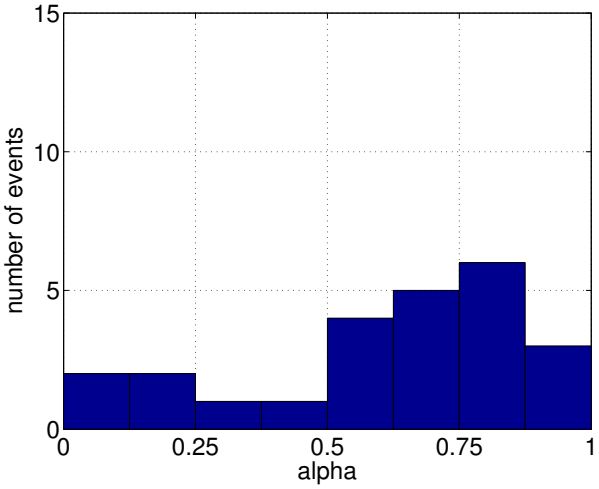

Fig. 2: Distribution of α (for 24 popcorn jumps).