

## **Description of supplementary movies**

### **Movie 1 : Thermal fiberboids.**

Onset of nylon fiber rolling. Plate temperature 160°C, fiber diameter 0.4 mm. Movie in real time.

### **Movie 2 : Hygroscopic fiberboids.**

Rolling capellini (spaghetti) and a single polyacryamide rod on a wet substrate. 5 minutes per frame, played at 30 frames per second (fps).

### **Movie 3 : Transient rolling for initially hot fibers at room temperature.**

First sequence: Uncooked dry spaghetti on a hot plate (at 110°C). After the initial warm-up, the sample runs also on a cold substrate, but in the opposite direction with respect to the curvature, until the substrate and the filament temperatures have equilibrated.

Second sequence: A nylon filament (diameter 0.4 mm) runs on a 160°C hot substrate (on the right side) and drops onto a room-temperature cold substrate (on the left side) moving transiently until equilibration.

### **Movie 4 : Collective motion.**

Multiple nylon filaments (diameter 0.5 mm) on a hot plate bounce between two glass slide and mutually interact. Movie acquired at 1.3 fps and played at 15 fps.

### **Movie 5 : Obstacle interactions.**

Nylon bouncing off glass walls at 170°C showing two typical scenarios: inversion and oscillatory flapping on the glass obstacles. Movie in real time.

### **Movie 6 : Fiberboid collisions.**

Typical binary collision events for fiberboids of vexer type, realized by spaghetti on a wet towel. 5 minutes per frame, played at 30 fps.

### **Movie 7 : Fiberboid tunneling.**

Binary collision event for two vexers of different lengths, realized by spaghetti on a wet towel. 5 minutes per frame, played at 30 fps.