

Master 2 Internship

Laboratory name: **d'alembert institute (jussieu)**

CNRS identification code: **UMR 7190**

Internship director's surname: **Sebastien Neukirch & Arnaud Antkowiak**

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Internship location: **Sorbonne University – 75005 Paris – France**

Thesis possibility after internship: **Yes**

Paid internship

Dissipation in spider webs

Orb webs comprise three different types of threads, frame, radial, and capture threads. The capture thread is laid down by the spider following a spiral path. We believe this thread has important mechanical properties which are responsible for the capture of flying insects.

The goal of the internship/thesis is to show that liquid droplets sitting on spiral threads of a spider web are responsible for the capture, dissipation, and structural integrity of the system.

We have shown that both synthetic and natural threads are capable of coiling inside liquid drops sitting on them, see figure. Now, we want to show that this mechanism takes place in real spider webs, and we want to study its dynamical properties.

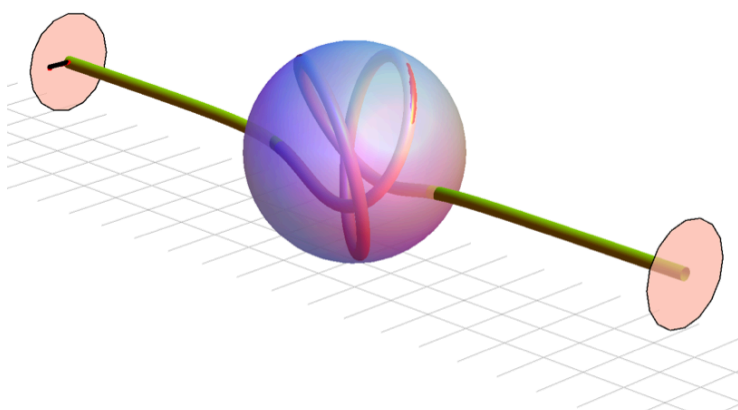
How does a spider web capture a flying insect without breaking?

How is the kinetic energy dissipated?

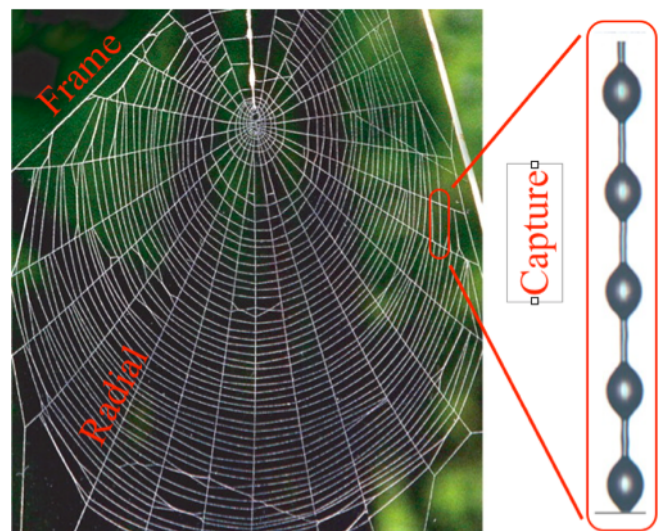
How does the web keep its integrity under high wind conditions?

Collaboration with Oxford department of Zoology (Prof. Fritz Vollrath)

Experiments involve spiders, high-speed camera, and nano-newton force transducers



A thread decorated with a small droplet exhibits the windlass mechanism



A spider web with its 3 different types of thread