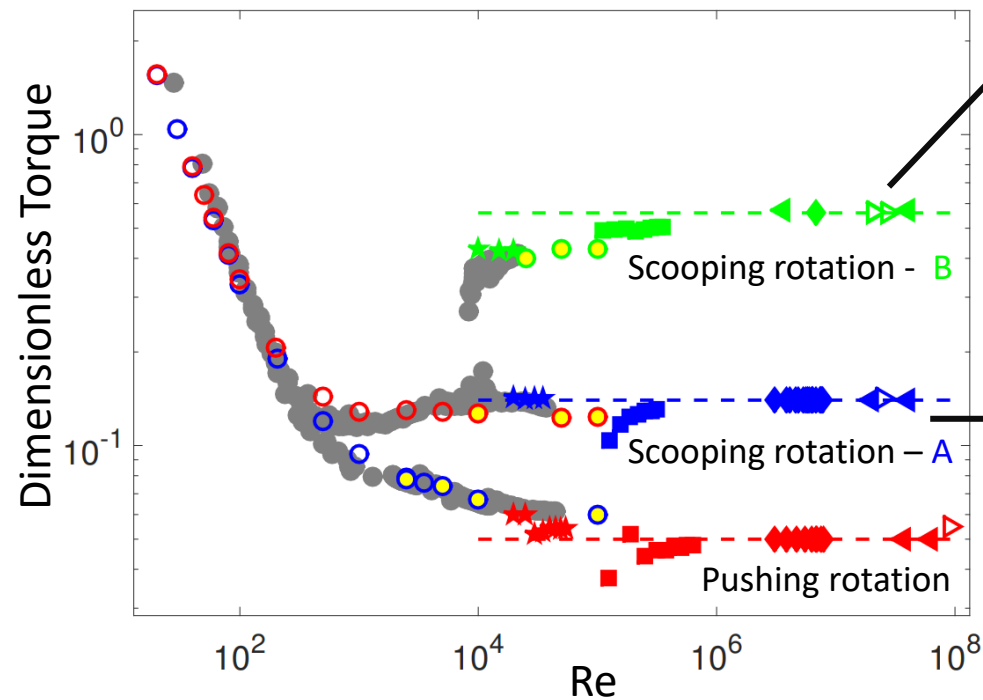


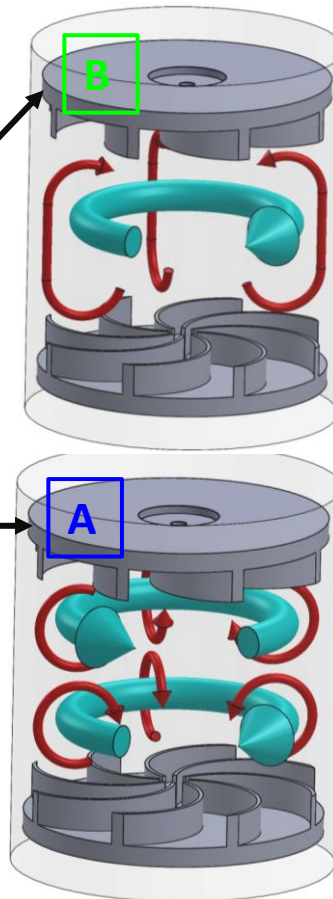
Is there a link between small-scale extreme events and large-scale bifurcations?

Benjamin Musci, J. LeBris, A. Cheminet, B. Dubrulle

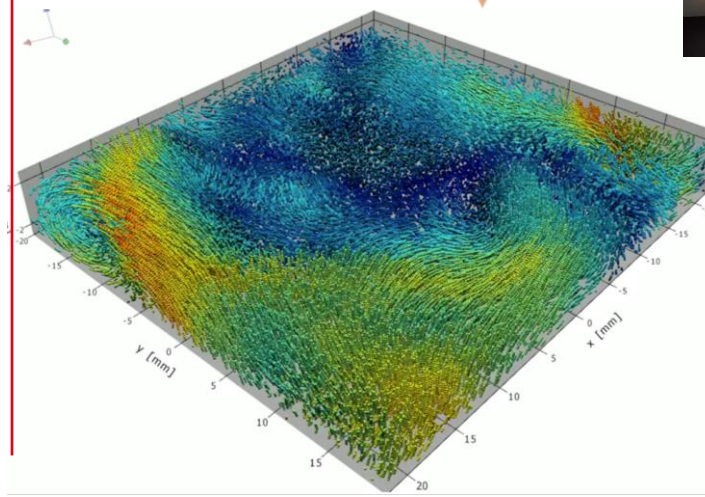
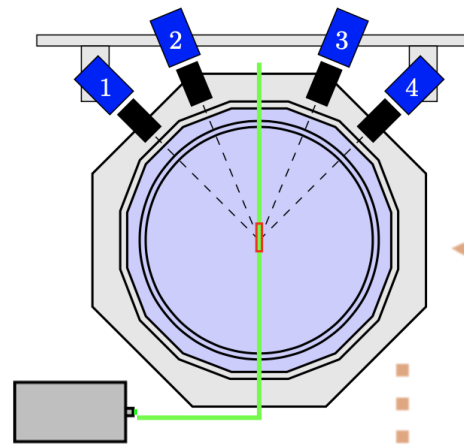
Turbulent Von Karman Swirling Flow



Flow exhibits several spontaneous bifurcations between different large scale turbulent states



Use experimental methods such as 4D Particle Tracking Velocimetry to sample the flow



→ Time resolved datasets, with resolution near or below the Kolmogorov scale: $0.4\eta - 5\eta$

Extreme Event identification and analysis

Following work of Duchon et Robert 2000, can obtain a scale dependent energy budget:

$$\partial_t E^l + \partial_j J_j^l = \underbrace{-\Pi_{DR}^l}_{\text{Inertial dissipation}} - \mathcal{D}_\nu^l$$

Alternatively, looking at alignment of vorticity and strain rate tensor:

$$s_{ij} = \frac{1}{2}(\partial u_i / \partial x_j + \partial u_j / \partial x_i)$$

$$\boldsymbol{\omega} = \nabla \times \mathbf{u}$$

