Looking for prints of singularities in an experimental turbulent swirling flow

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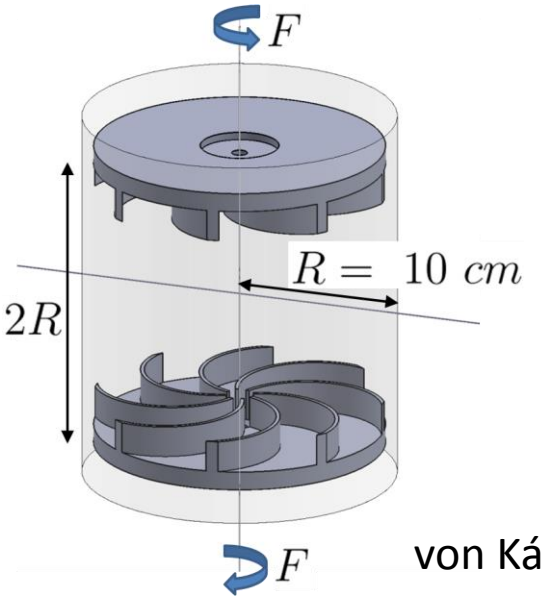
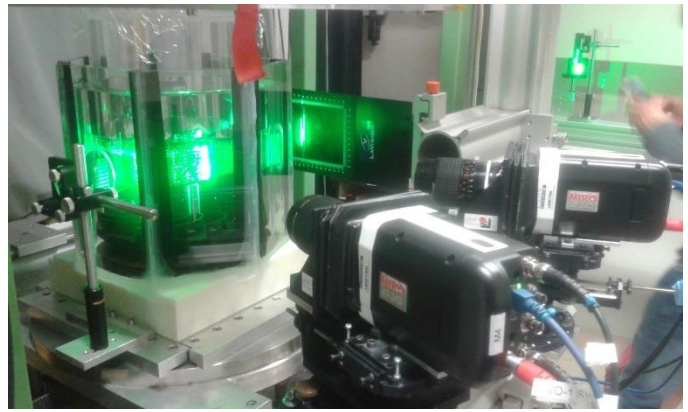


von Kármán flow

$$\begin{cases} \partial_t \mathbf{u} + \mathbf{u} \cdot \nabla \ \mathbf{u} = -\nabla p + \nu \Delta \mathbf{u} \\ \nabla \cdot \mathbf{u} = 0 \end{cases}$$



Tomographic PIV

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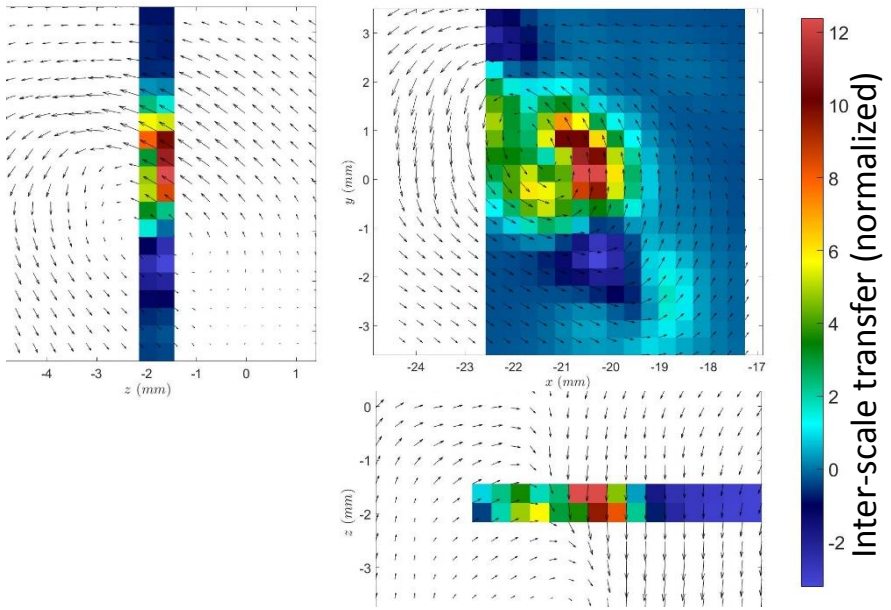
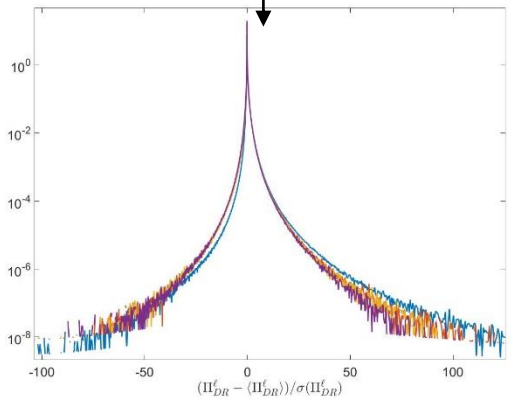
Weak Kármán-Howarth-Monin equation :

$$\partial_t \frac{\mathbf{u}\cdot\mathbf{u}^\ell}{2} + \nabla\cdot\mathbf{J}^\ell = -\frac{1}{4}\int \nabla\phi^\ell\cdot\boldsymbol{\delta}\mathbf{u}(\boldsymbol{\delta}\mathbf{u})^2 - \nu\int \Delta\phi^\ell \frac{\boldsymbol{\delta}\mathbf{u}^2}{2}$$



Inter-scale transfer



Viscous dissipation