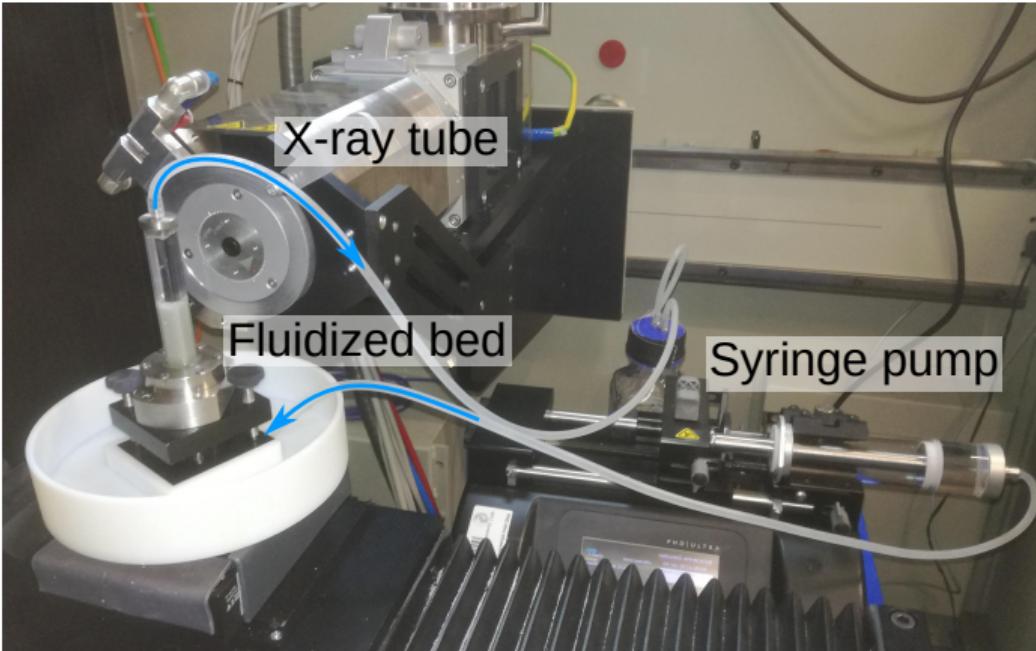
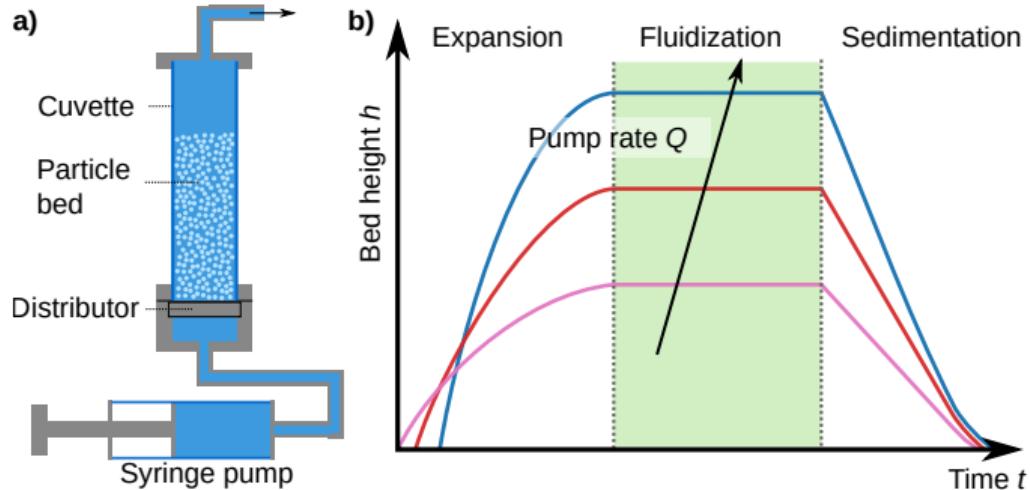


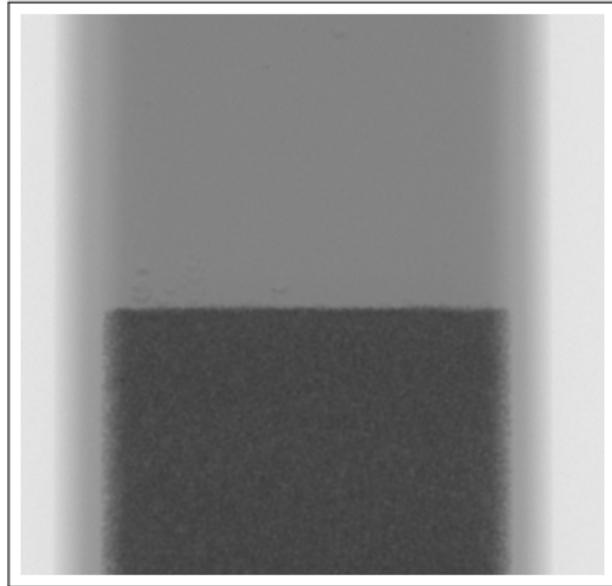
Experimental validation of X-DFA: A suspension of sedimenting particles



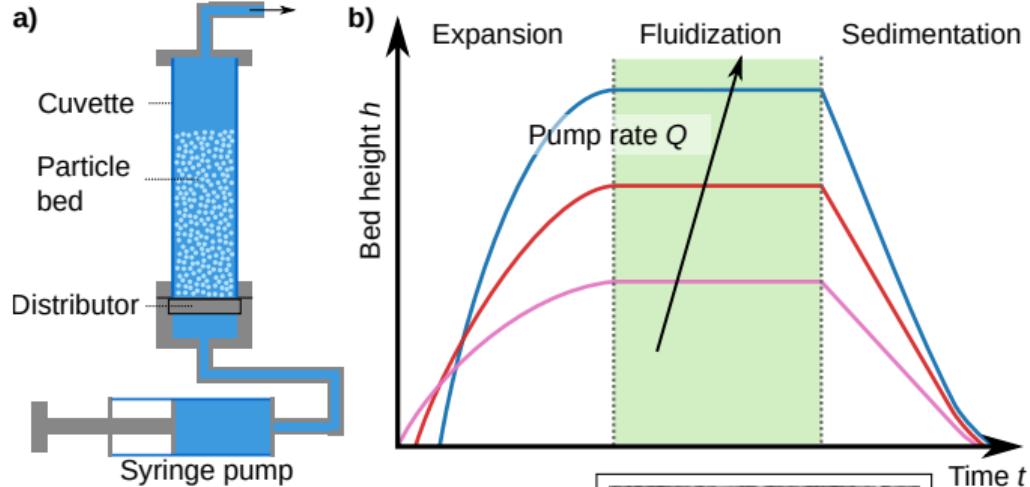
Experimental validation of X-DFA: A suspension of sedimenting particles



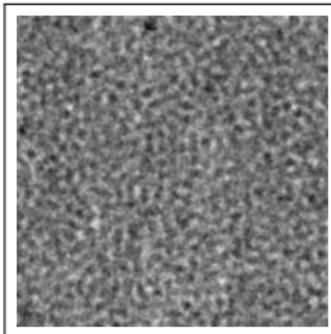
X-ray radiography



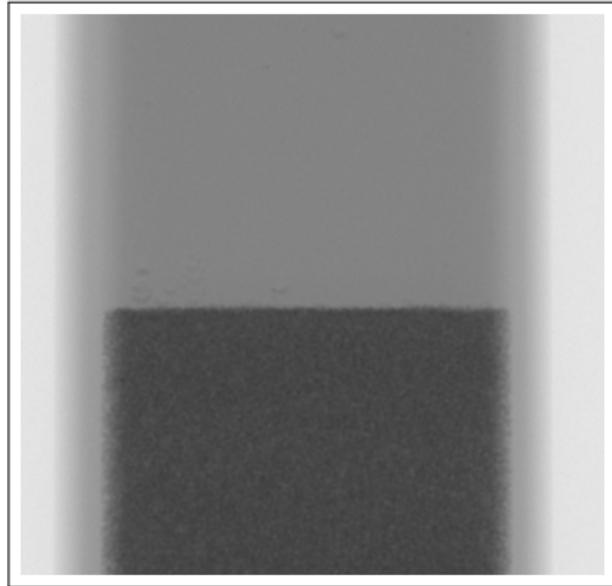
Experimental validation of X-DFA: A suspension of sedimenting particles



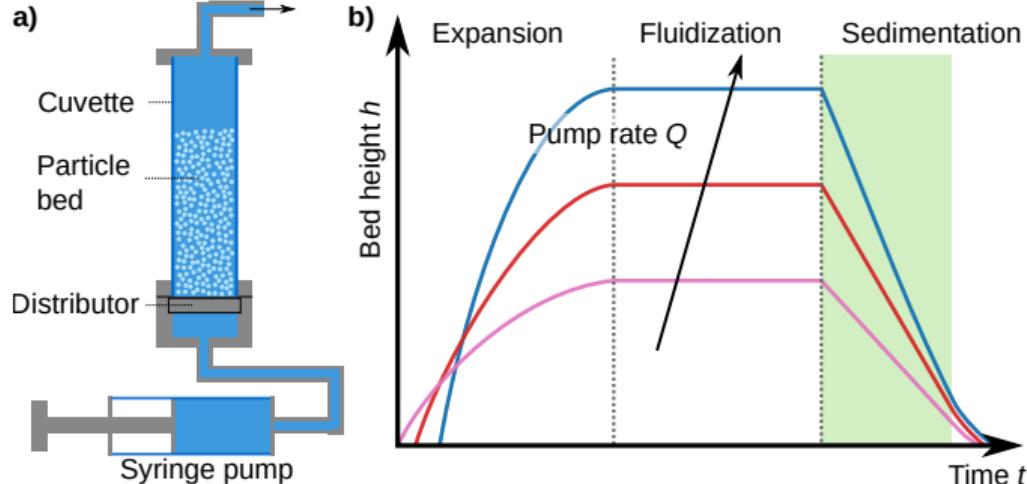
No reliable reference velocity!



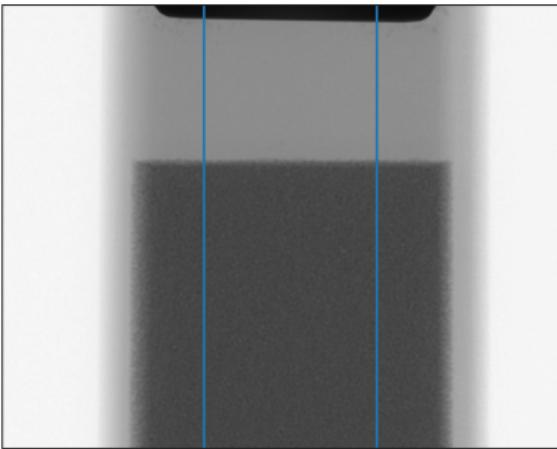
X-ray radiography



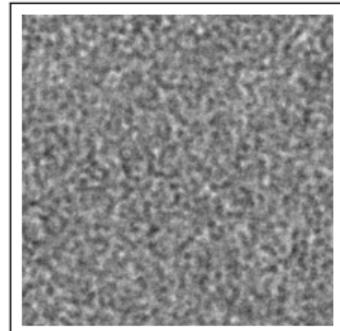
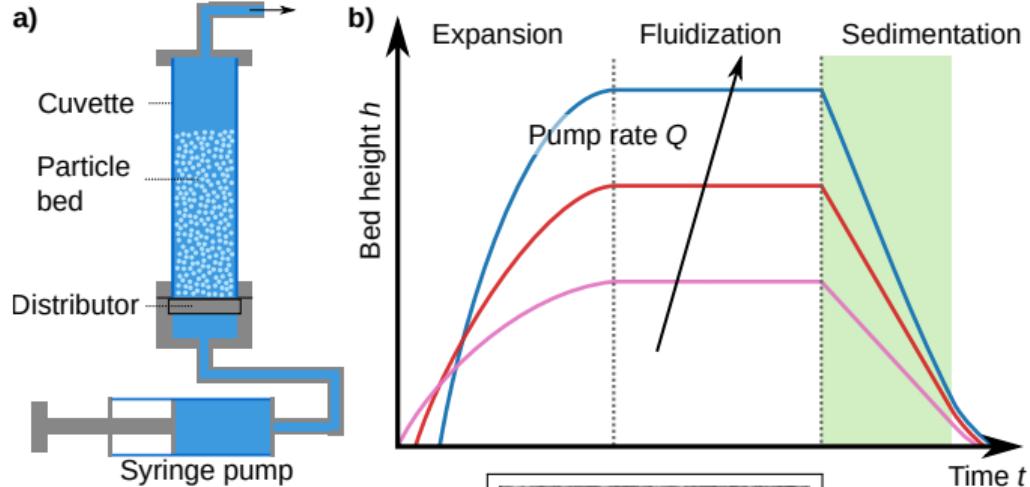
Experimental validation of X-DFA: A suspension of sedimenting particles



X-ray radiography

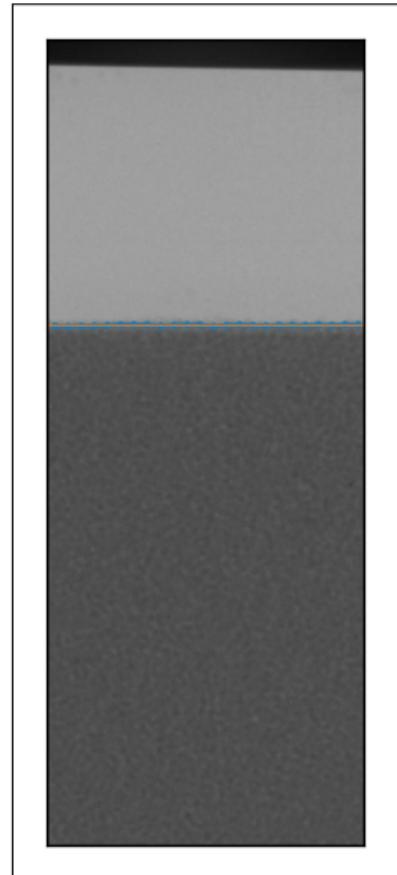


Experimental validation of X-DFA: A suspension of sedimenting particles



Comparison of
 $\langle v \rangle_{\text{dfa}}$ and $\langle v \rangle_{\text{front}}$

X-ray radiography



X-DFA for a suspension of sedimenting particles⁽¹⁾

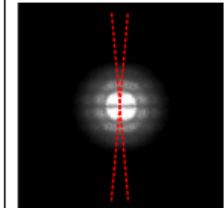


Image structure function:
 $D(\mathbf{q}, \tau) = \langle |\mathcal{F}[\Delta I(\mathbf{r}, t, \tau)]|^2 \rangle_t$

$$\langle v_s \rangle = q \tau_\nu \quad \delta v = q \tau_{\delta\nu}$$

(1) In collaboration with Manuel Escobedo, University of Düsseldorf

X-DFA for a suspension of sedimenting particles⁽¹⁾

Intermediate scattering function⁽²⁾:

$$f(q, \tau) = \cos(q\langle v_s \rangle \tau) \exp\left(-\frac{1}{2}q^2 \delta v^2 \tau^2\right)$$

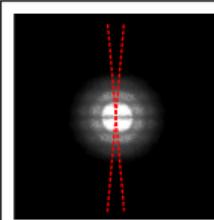
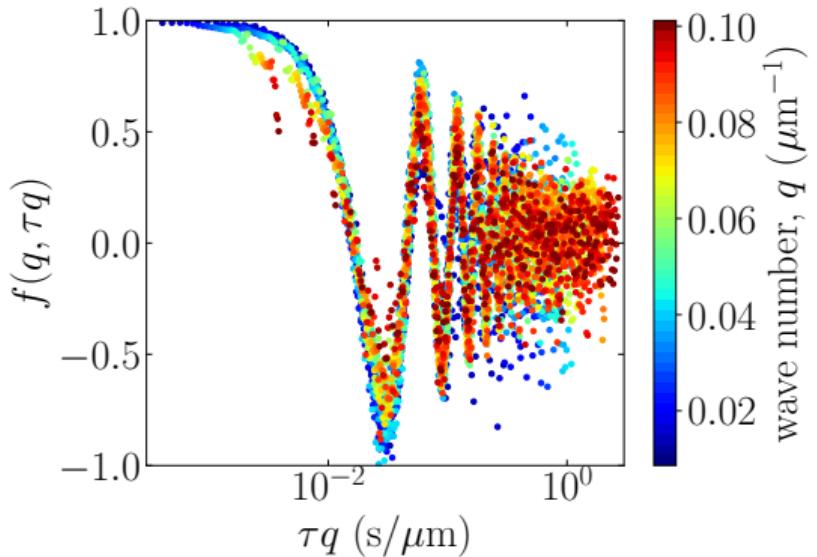


Image structure function:
 $D(\mathbf{q}, \tau) = \langle |\mathcal{F}[\Delta I(\mathbf{r}, t, \tau)]|^2 \rangle_t$

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(2) Kohyama *et al.* (2008)

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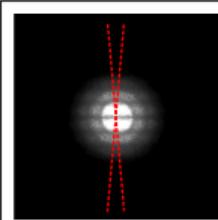
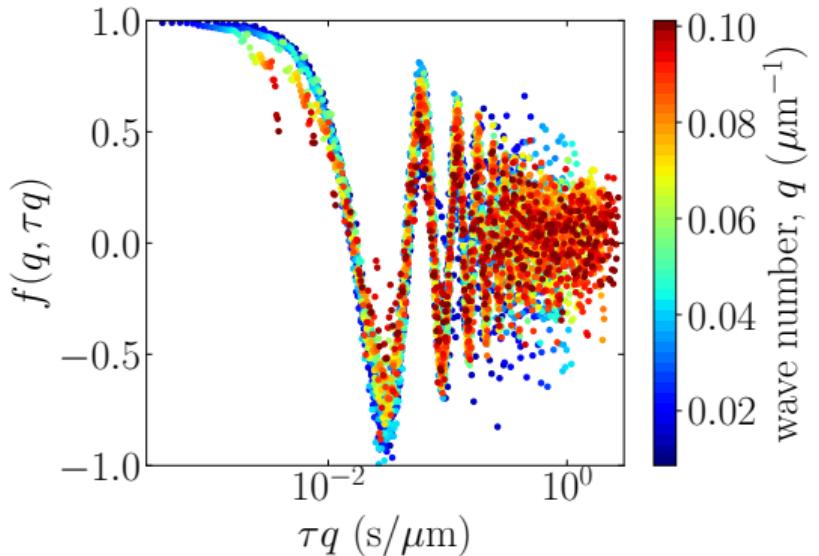


Image structure function:
 $D(\mathbf{q}, \tau) = \langle |\mathcal{F}[\Delta I(\mathbf{r}, t, \tau)]|^2 \rangle_t$

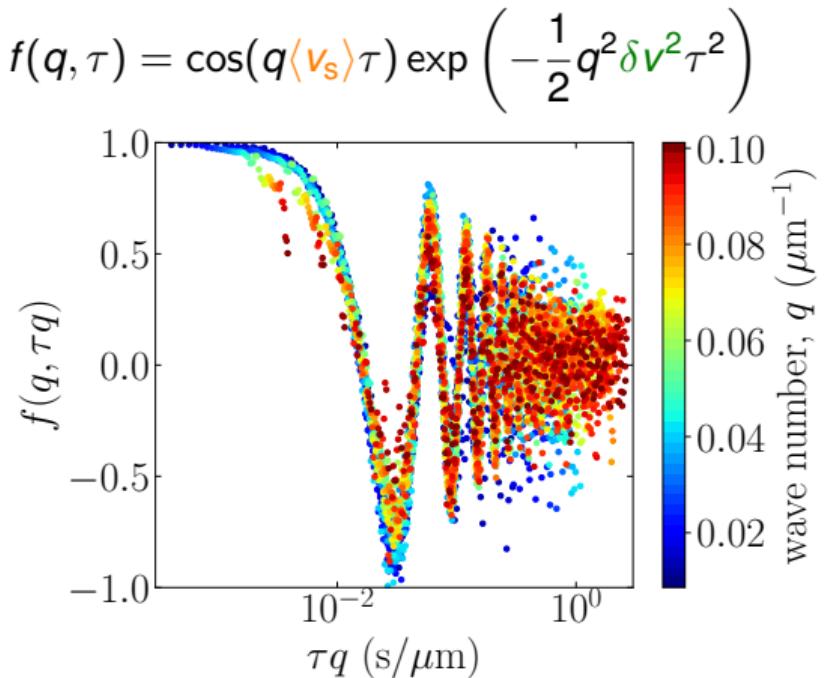
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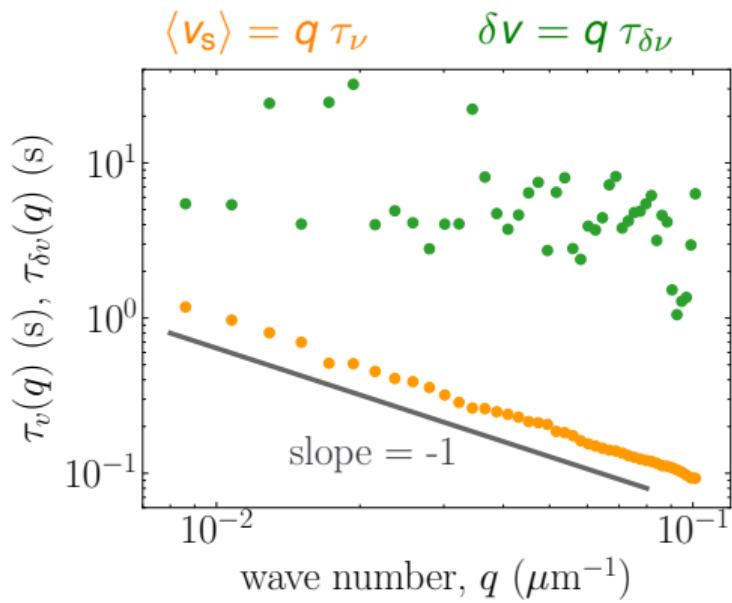
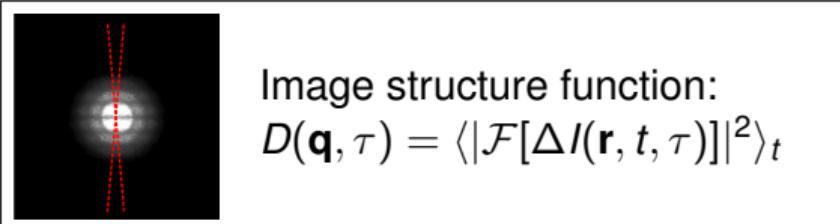
(2) Kohyama *et al.* (2008)

X-DFA for a suspension of sedimenting particles⁽¹⁾

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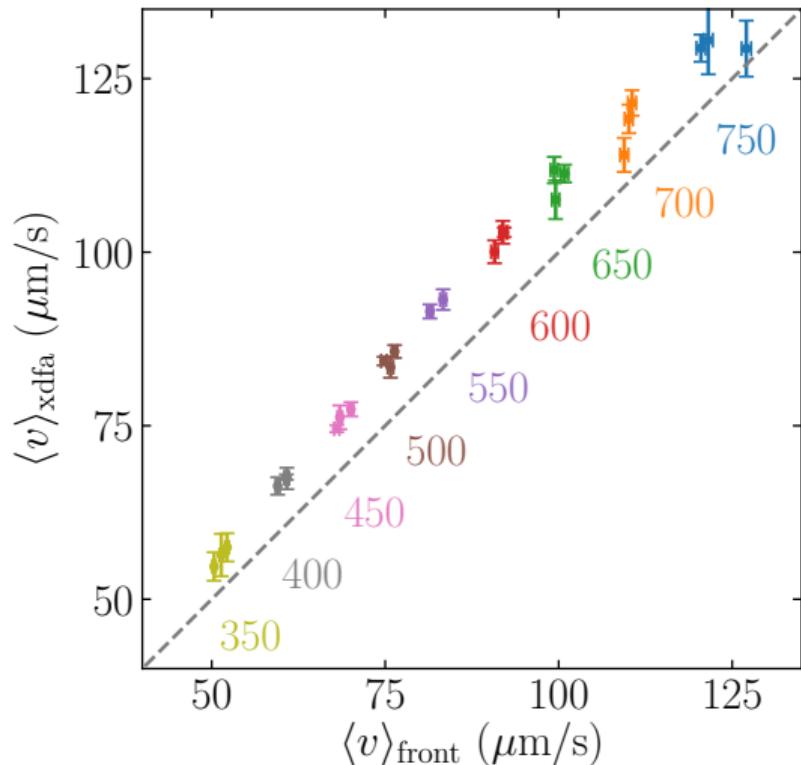


(1) In collaboration with Manuel Escobedo, University of Düsseldorf



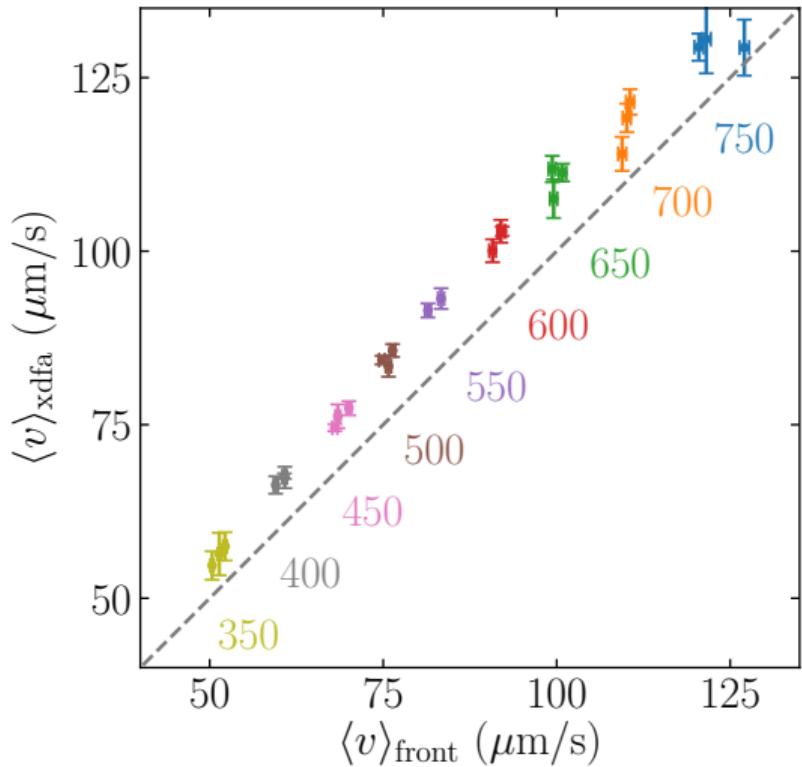
(2) Kohyama *et al.* (2008)

Front tracking vs. X-DFA

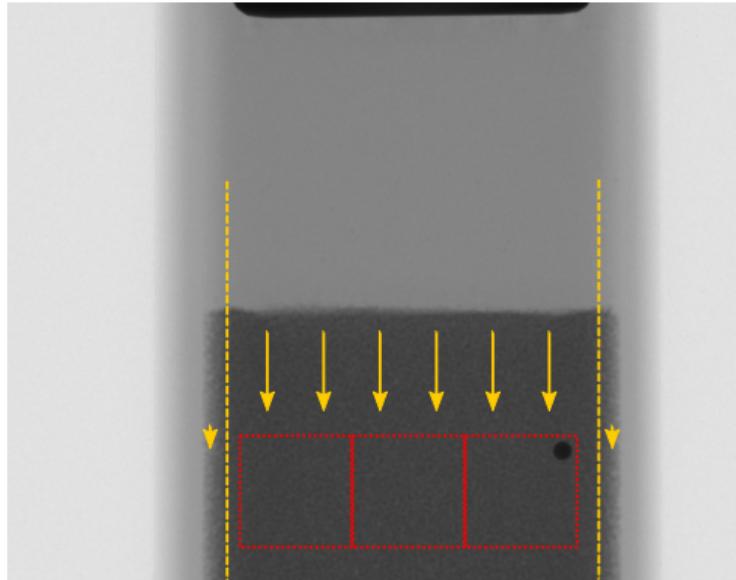


$\langle v \rangle_{\text{xdfa}} > \langle v \rangle_{\text{front}}$ by 9.4%

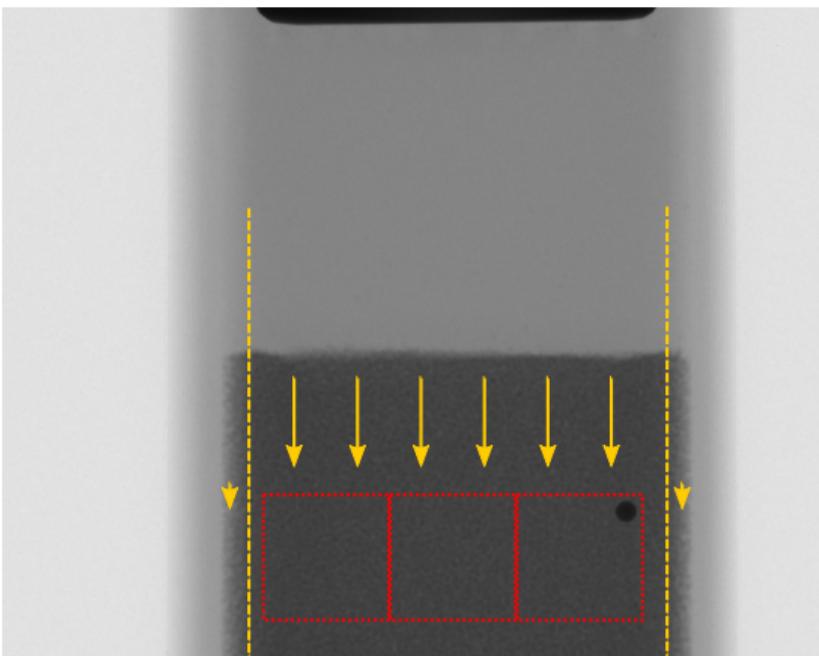
Front tracking vs. X-DFA



$\langle v \rangle_{\text{xdfa}} > \langle v \rangle_{\text{front}}$ by 9.4%

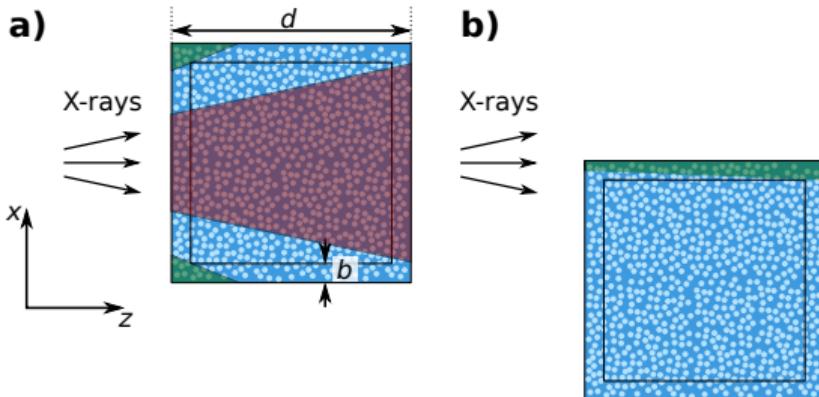


Estimate width of boundary layer



$\langle v \rangle_{\text{xdfa}} > \langle v \rangle_{\text{front}}$ by 9.4%

$\langle v \rangle_{\text{xdfa}}$ takes two layers into account
 $\langle v \rangle_{\text{front}}$ takes four layers into account



Estimation:

Boundary velocity = 0

Else = const.

→ $b \approx 3$ particle diameters

Thank you for your attention!

