Dimensional analysis and scaling laws for ultrasound-driven flow with moderate acoustic attenuation

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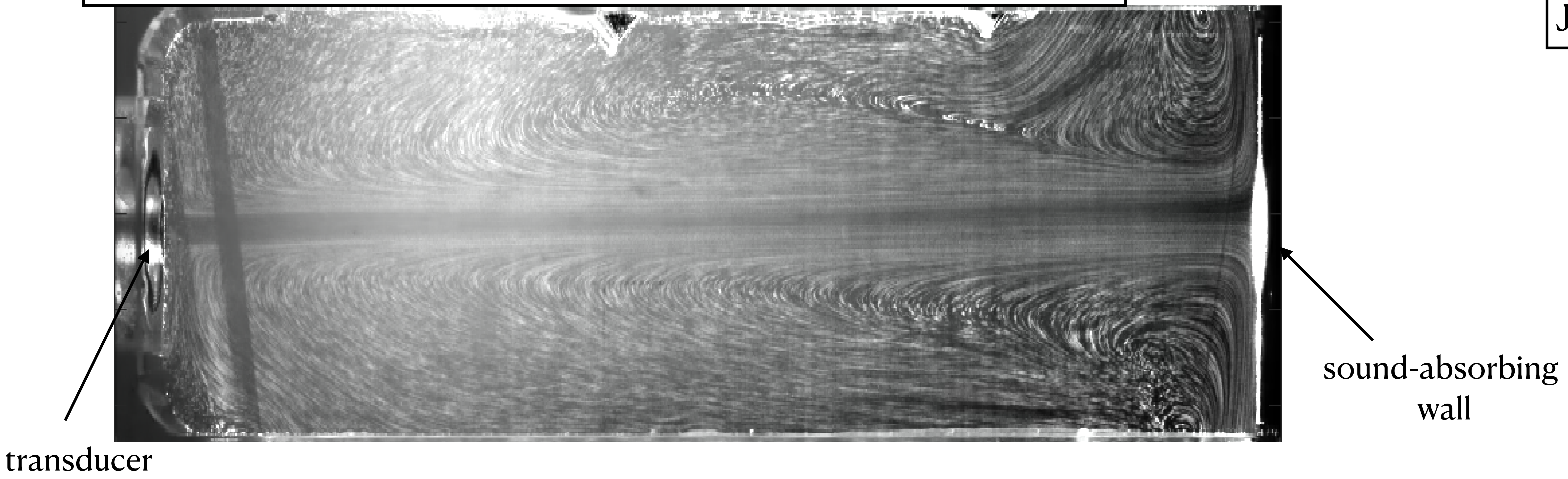
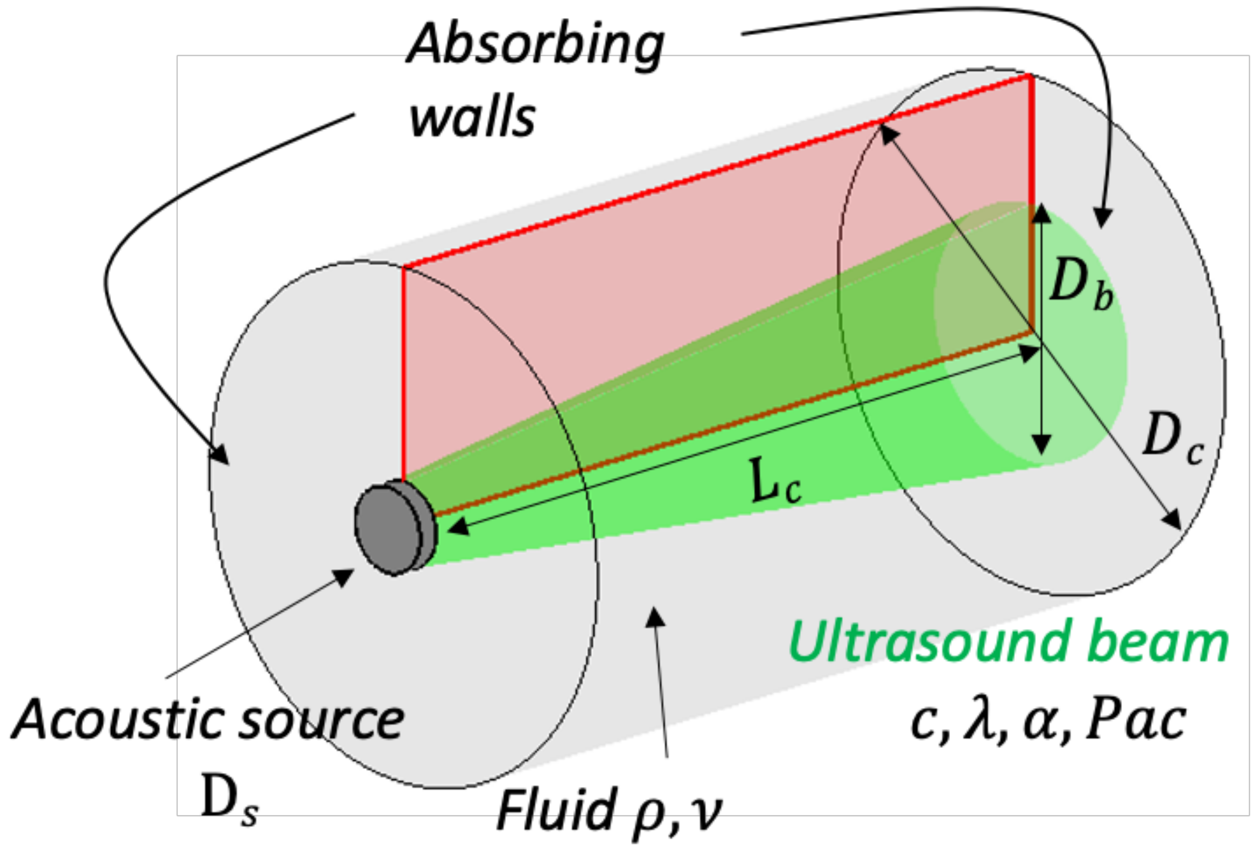
Eckart streaming at 8 MHz in water (time- averaged PIV images)



Simulated configuration



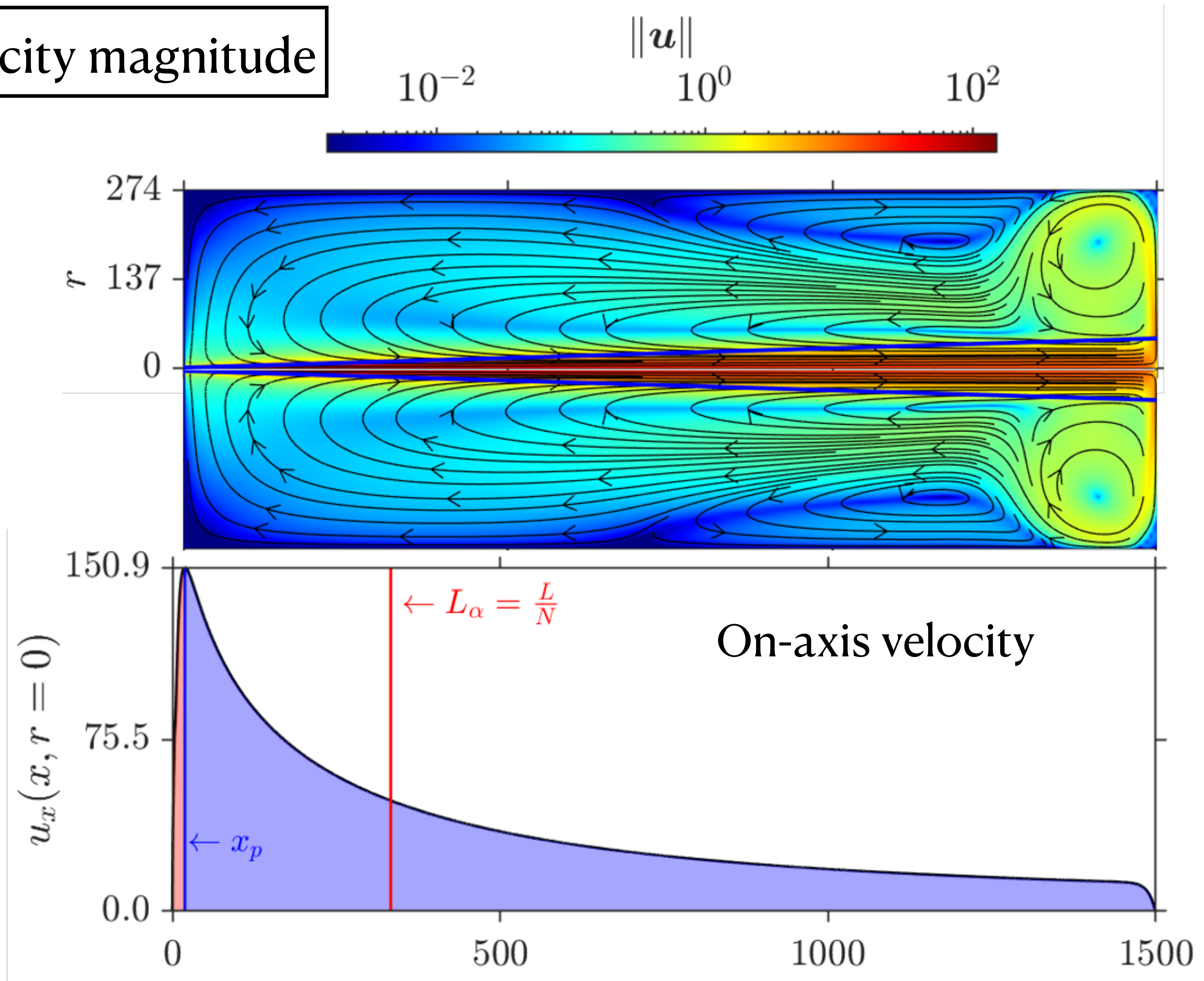
With hydrodynamics lengthscales, the set of parameters:

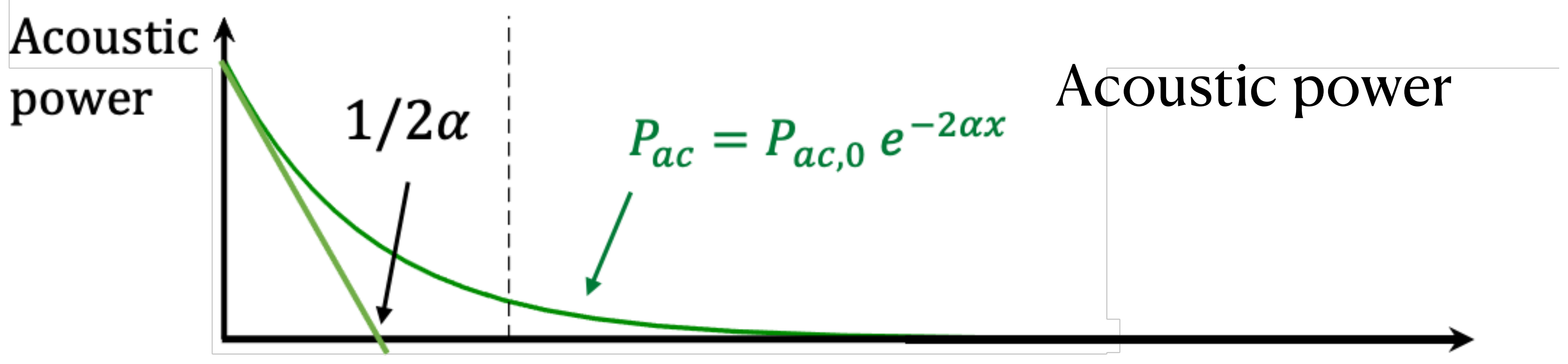
$N = \alpha L_c$ ATTENUATION LENGTH $\in [0.05; 4.5]$

$S = 1.22\dfrac{\lambda}{D_s}$ Diffraction of the beam (fixed)

$Gr_{ac} = \dfrac{32\alpha P_{ac} D_s}{\pi \rho \nu^2}$, ... + geometry ratios

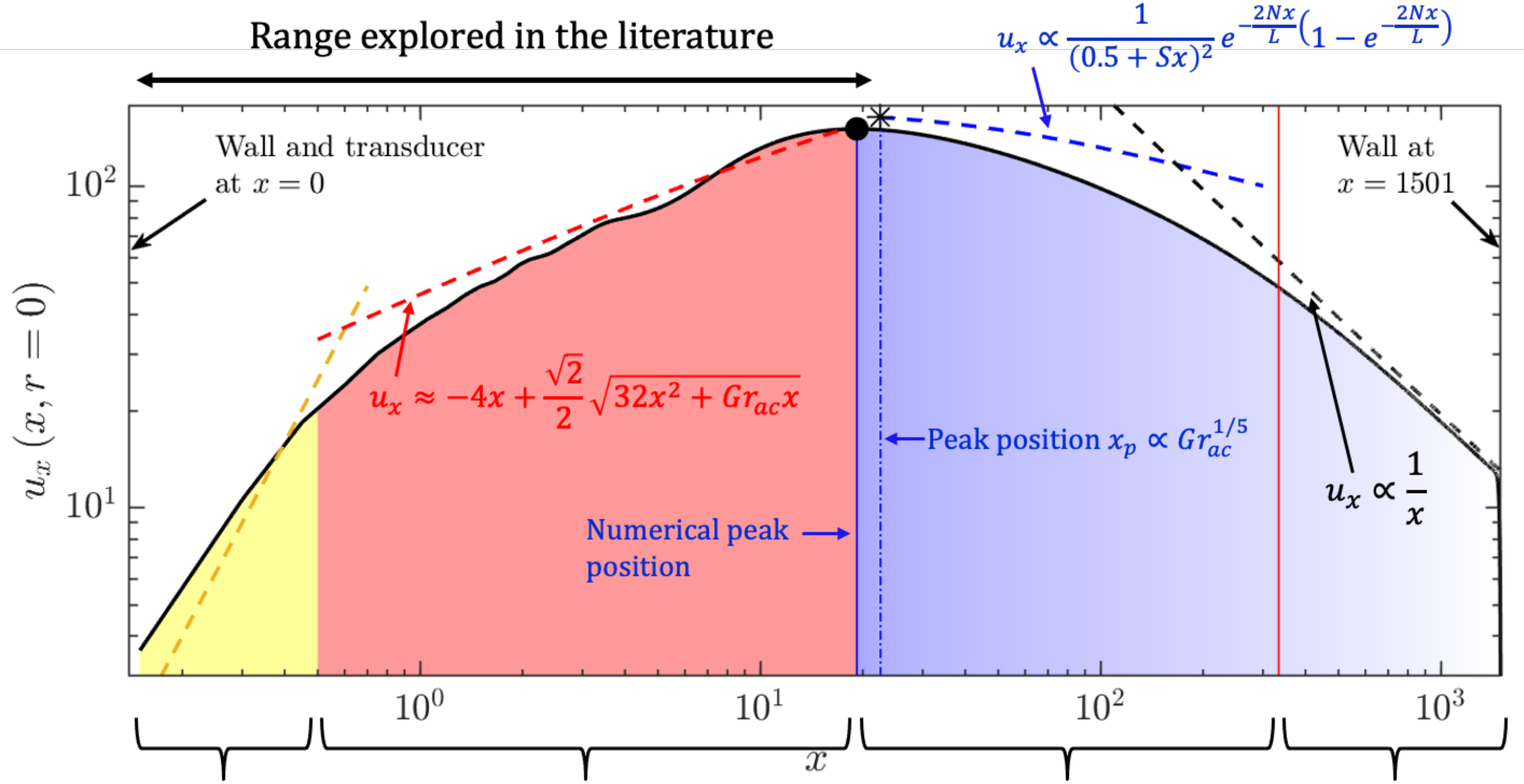
Jet velocity magnitude





Results on the poster

Scalings laws of on-axis velocity on a wide range of forcing magnitude for $N \sim 1$ for each part of the jet



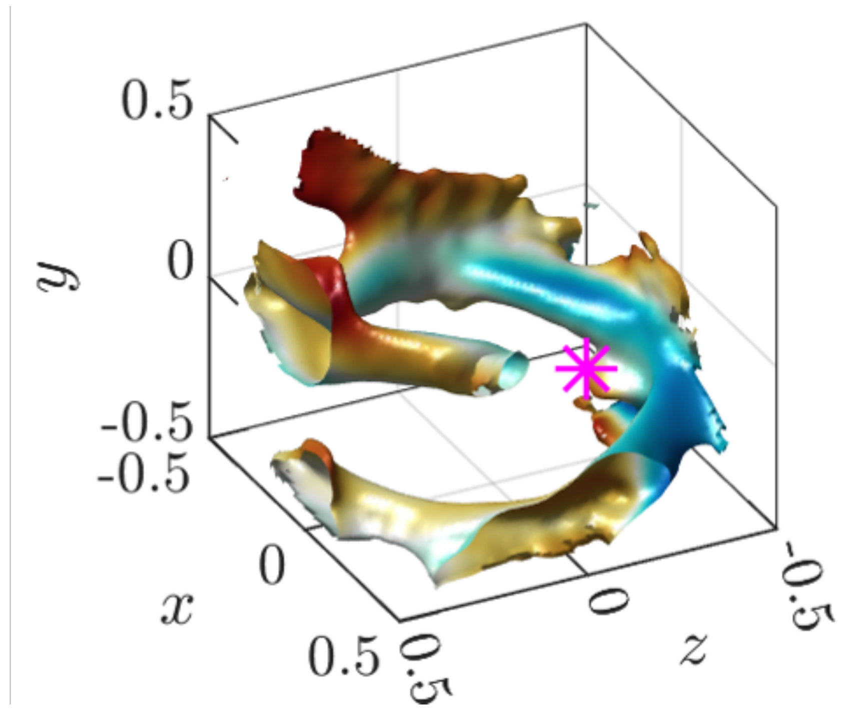
Recirculation at the jet origin (Moudjed *et al., PRE*, 2015)

Inertia forces ~ acoustic force (+viscous forces)

Acoustic force ~ Viscous forces

Inertia forces ~ Viscous forces

+ some coherent **comparison with experimental data**



+ **sonic blooms** ...