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Optimad

Thirty Month Review Meeting

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OPTIMAD

Status of activity

WP2

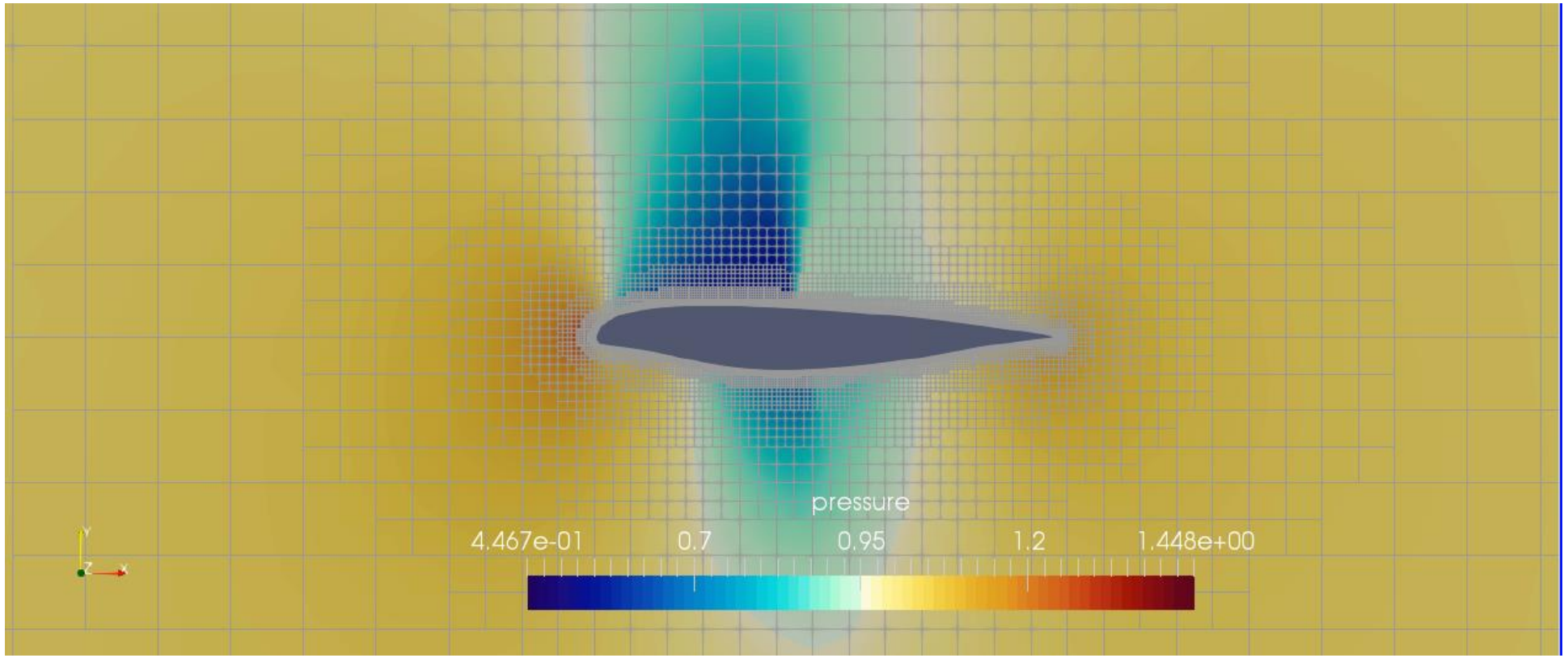
- kinetic energy conserving scheme has been implemented
  - ✓ generation of data #Mach=0.76 for WP4
- buffeting at Mach=0.86 (??) -> dismiss
  - still accuracy issues at grid refinement ??
- working on CRM

WP4

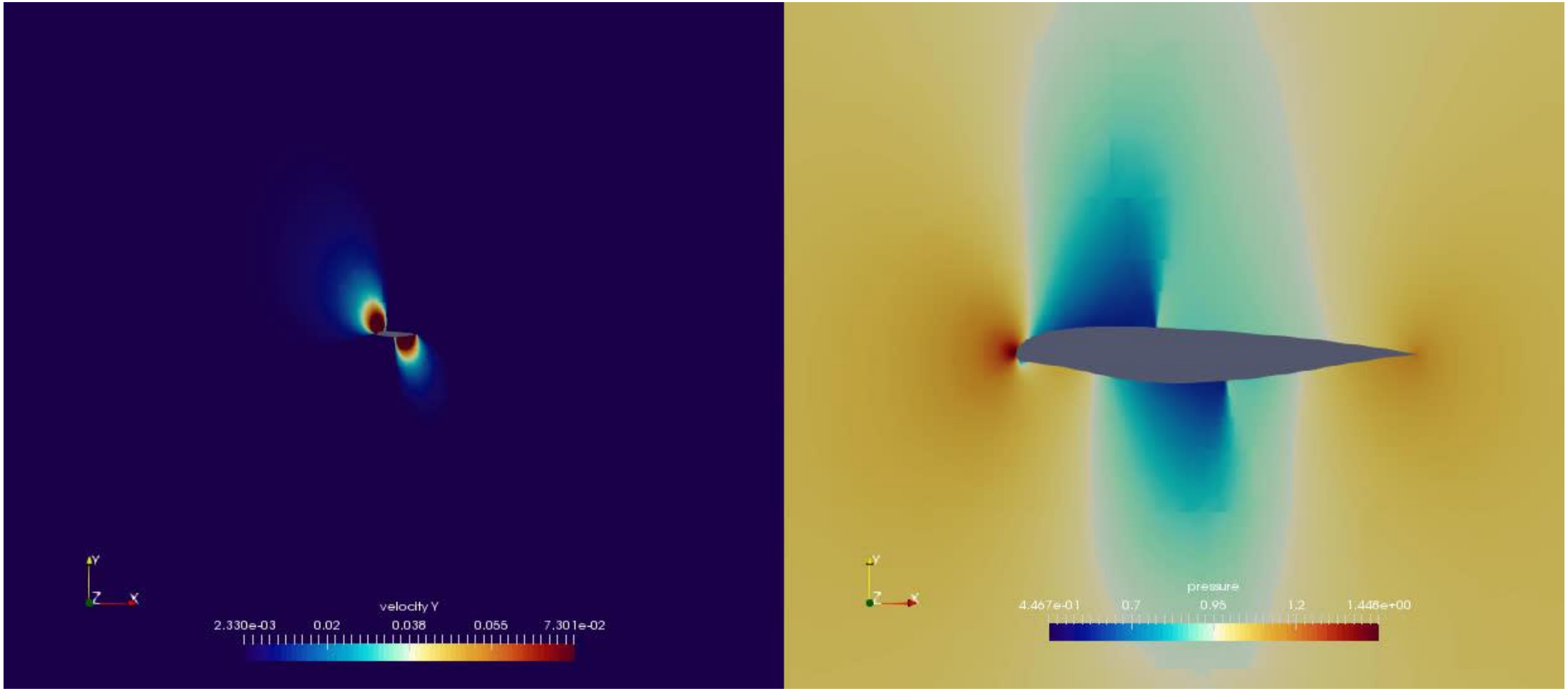
- hybrid CFD/POD tool has been adapted to gust simulations
- POD + dynamic mesh still missing

WP2

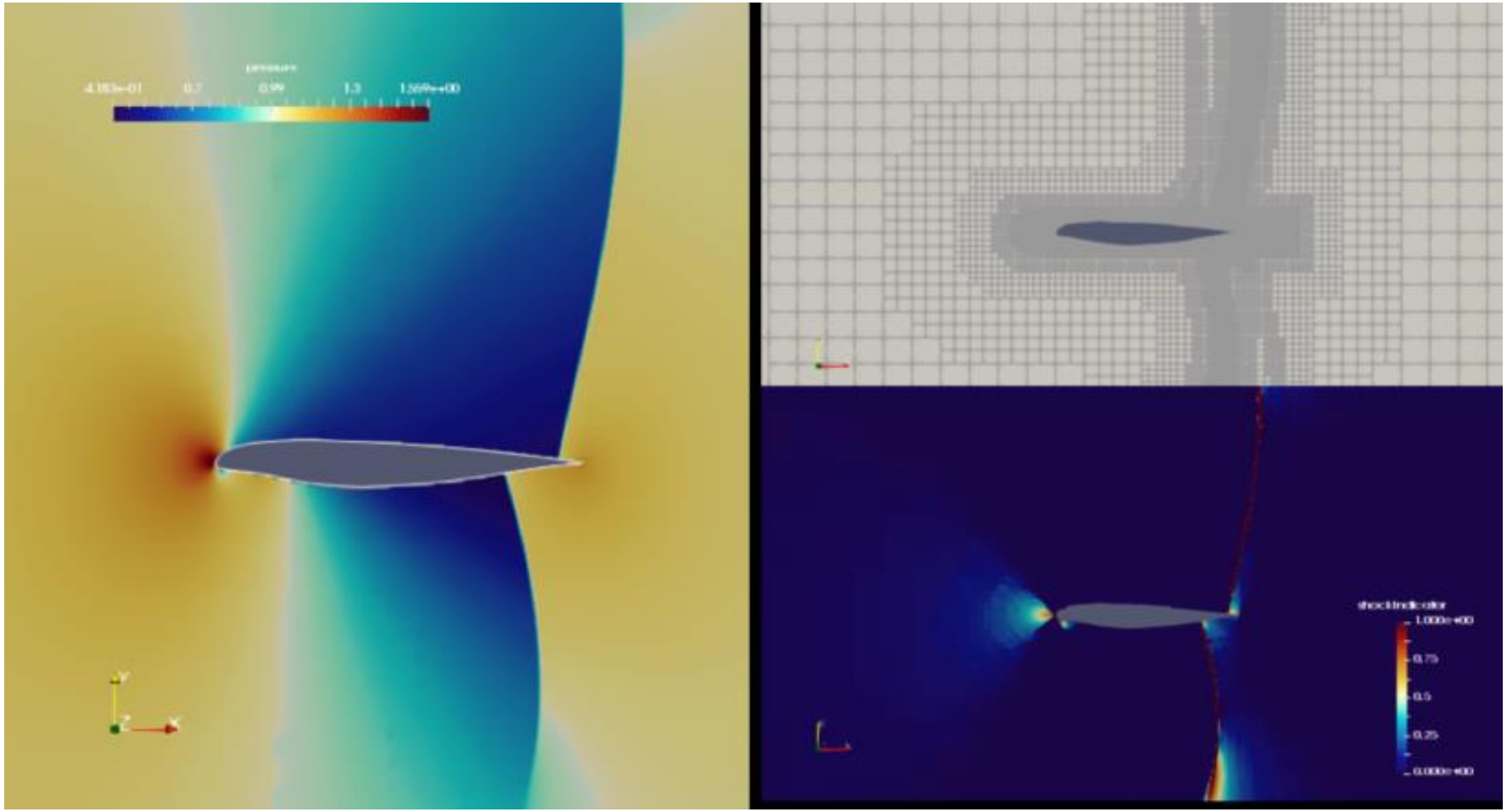
Crank airfoil, fixed grid, Ma=0.76



Crank airfoil

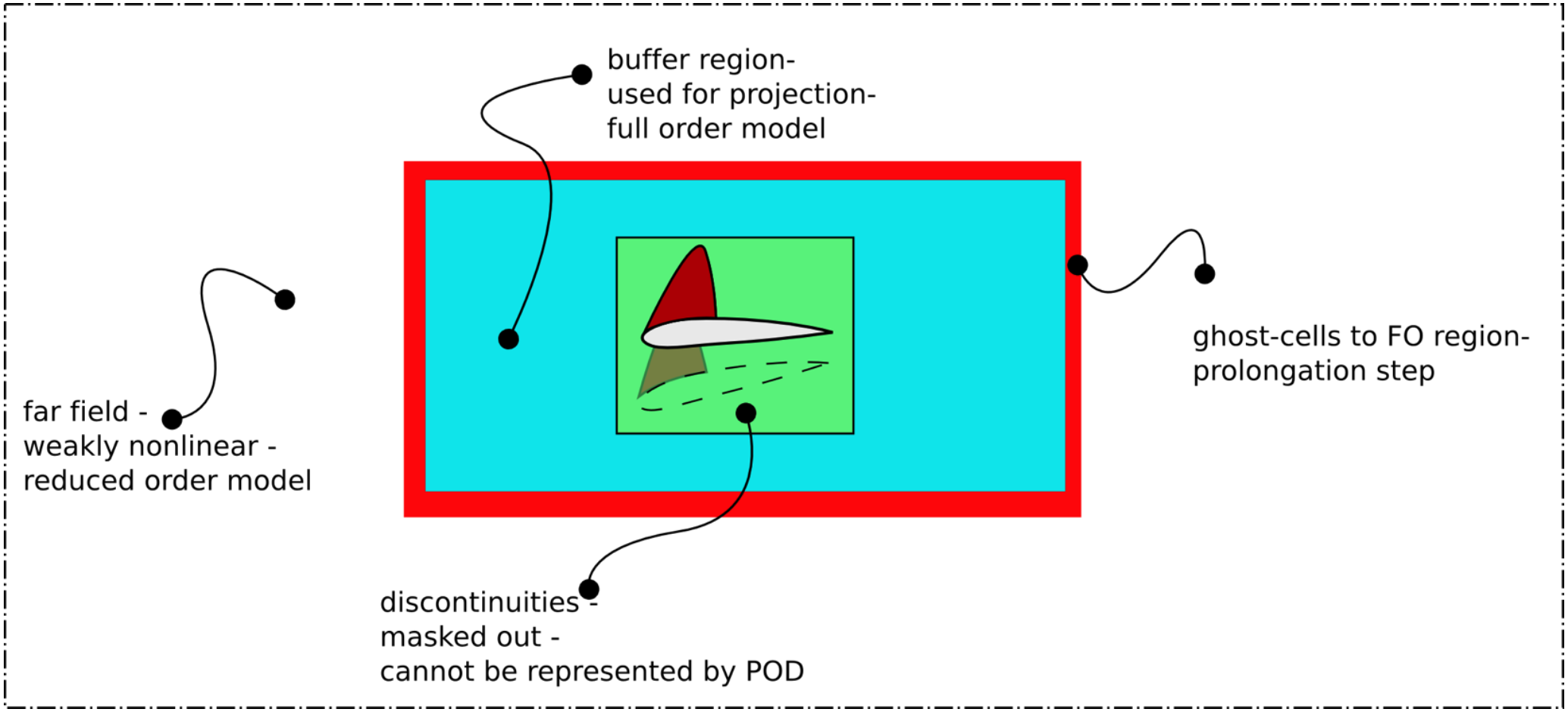


Buffetting limit?

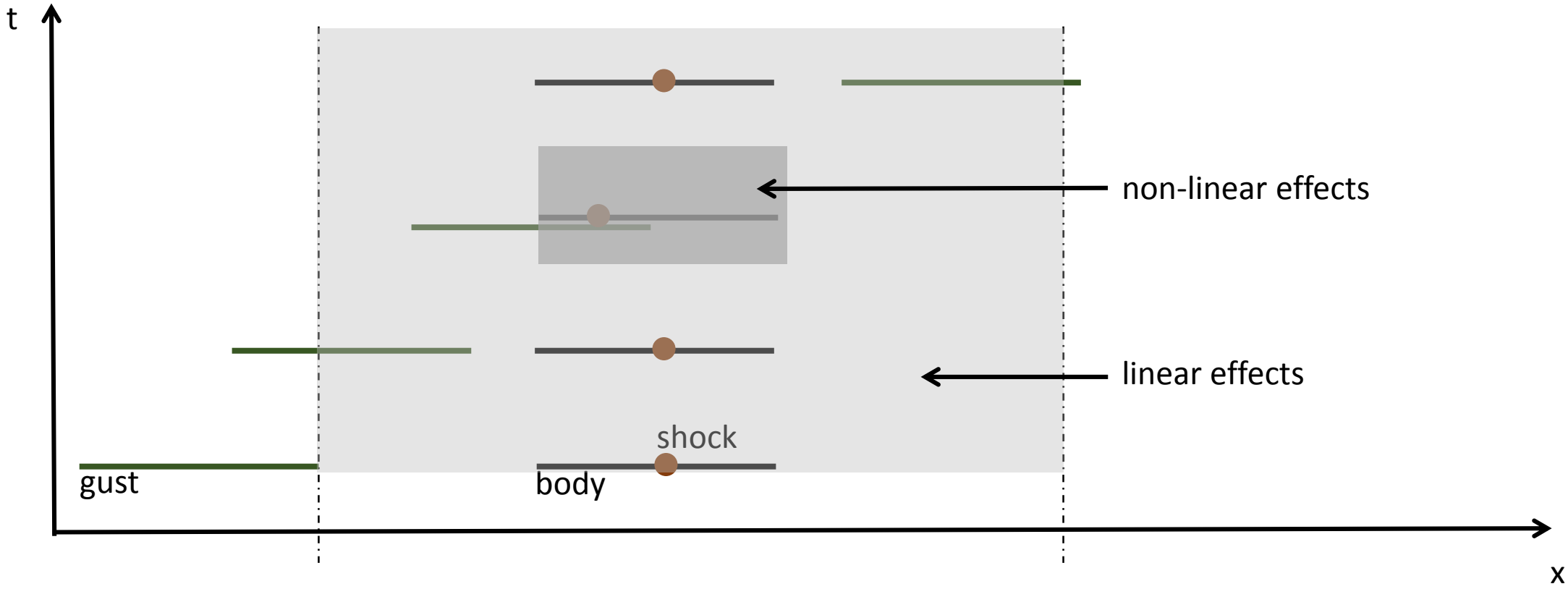


WP4

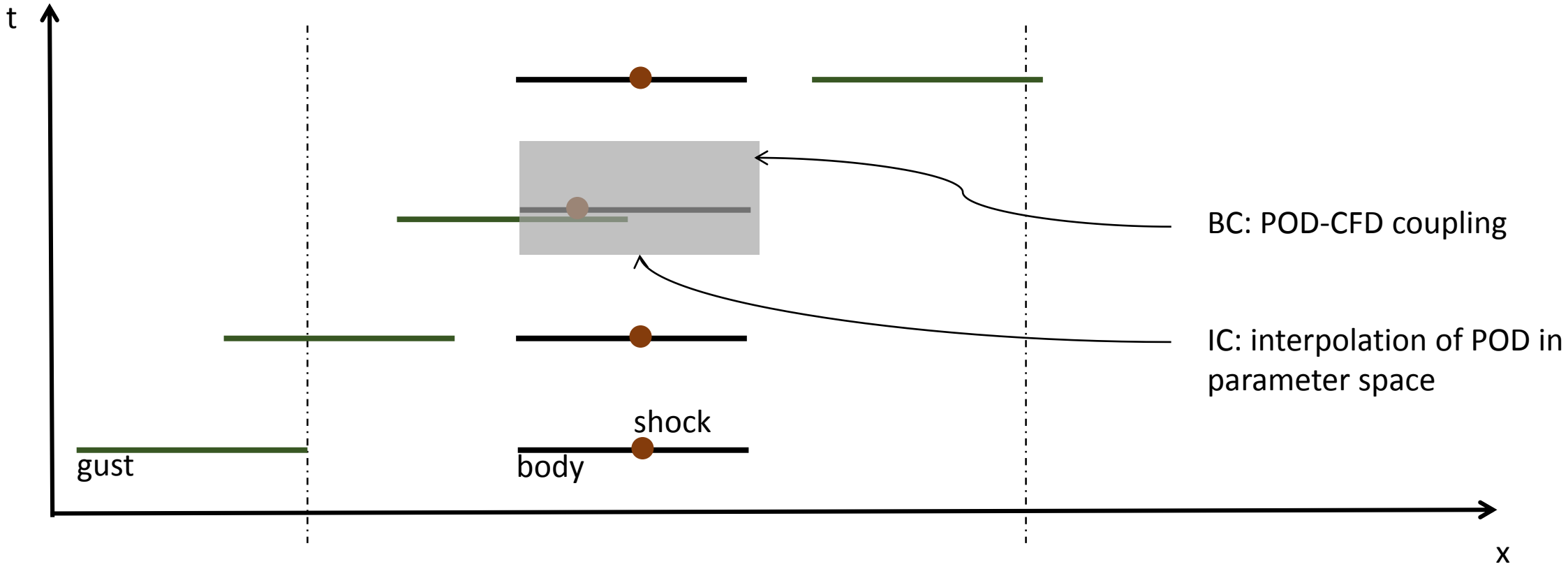
Hybrid CFD/POD tool



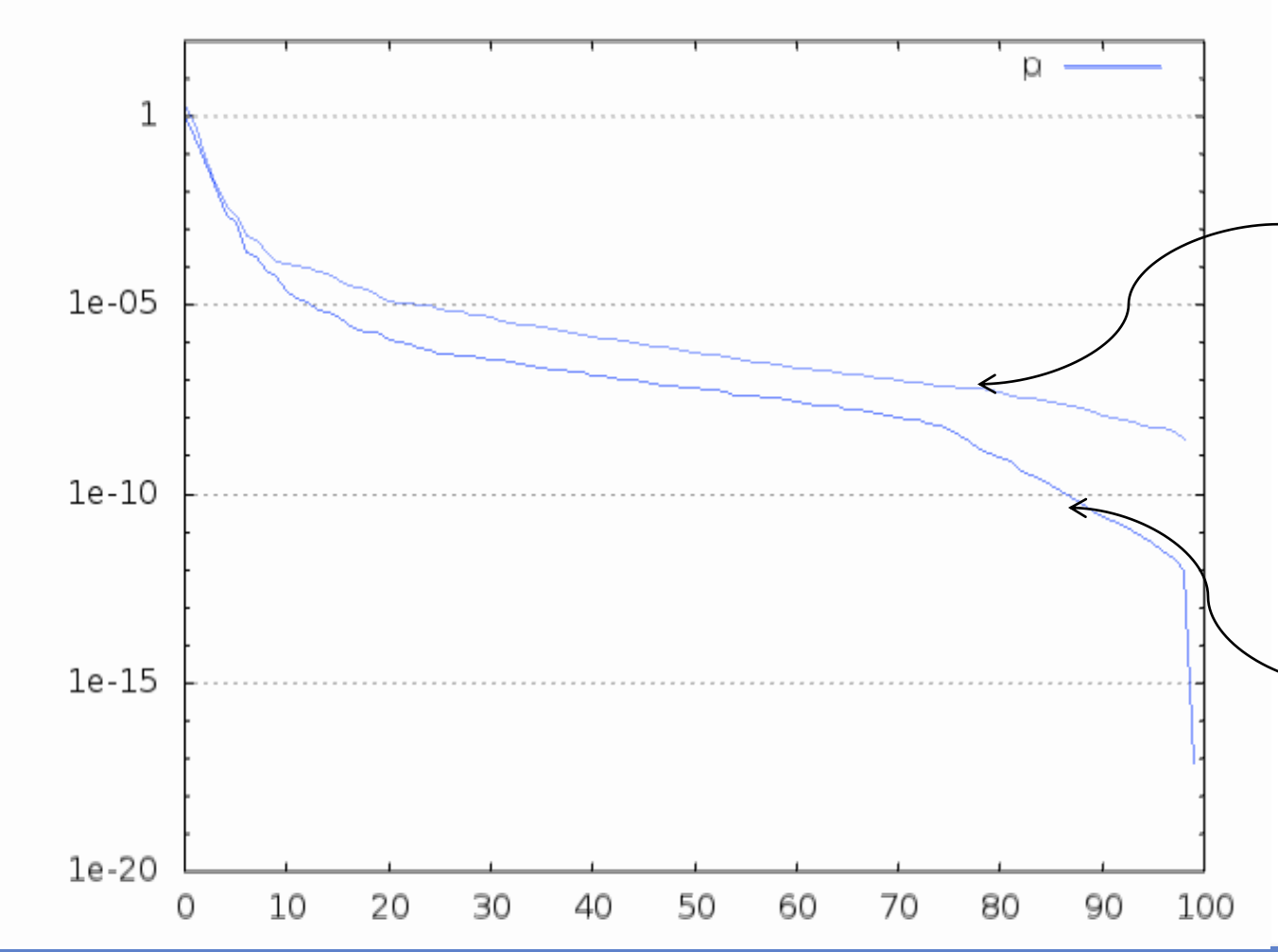
Adaption to Gust



Adaption to Gust



POD – One consideration



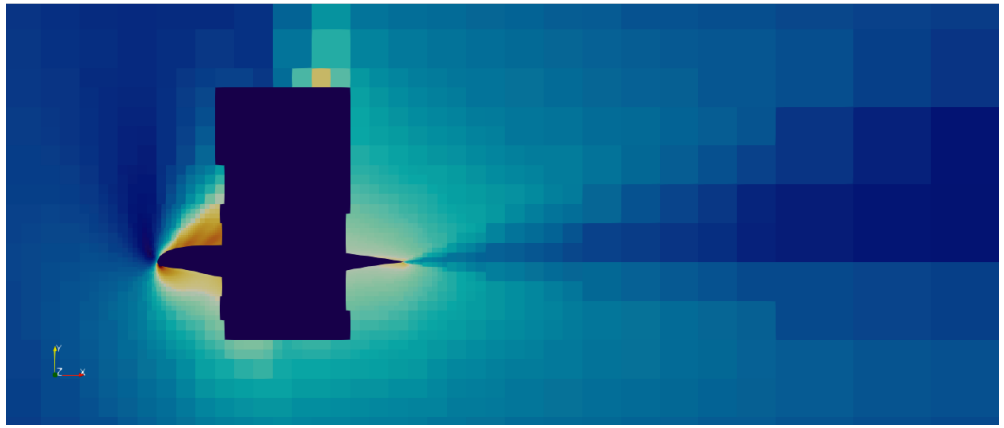
velocity

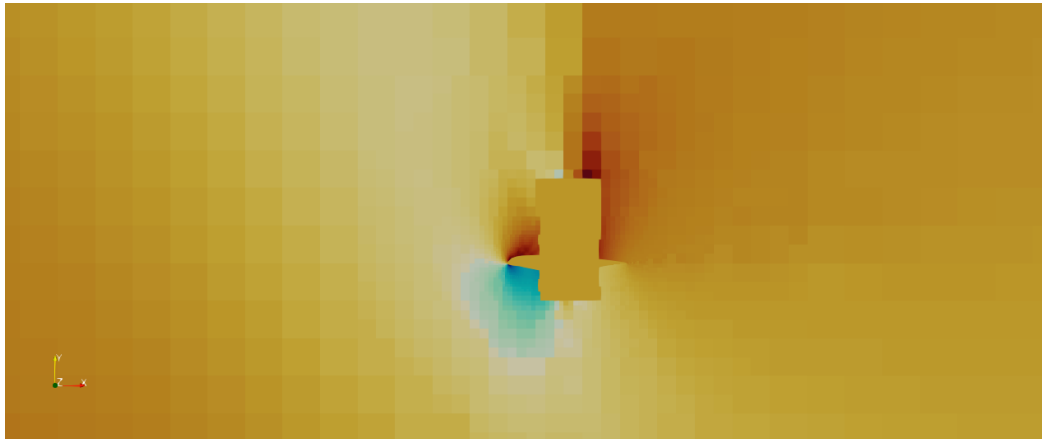
pressure

Velocity

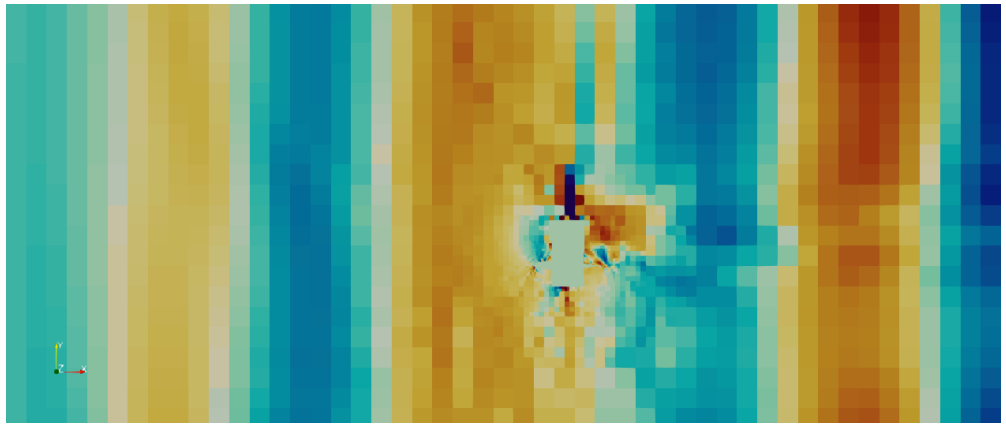
Pressure

#1

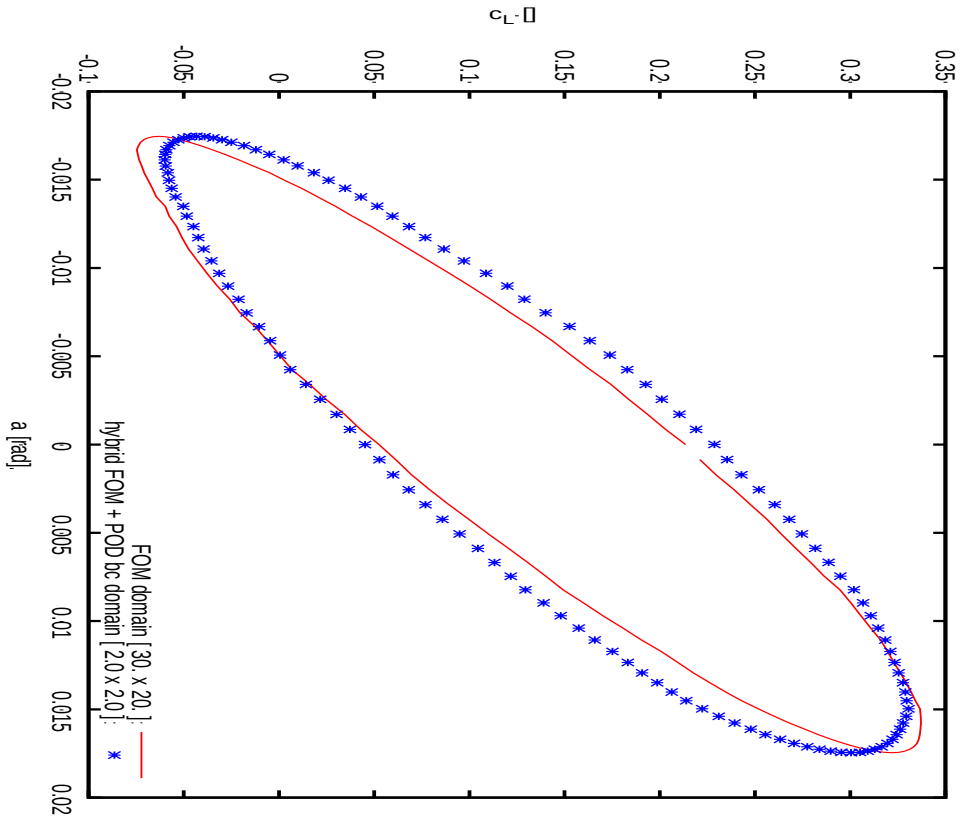


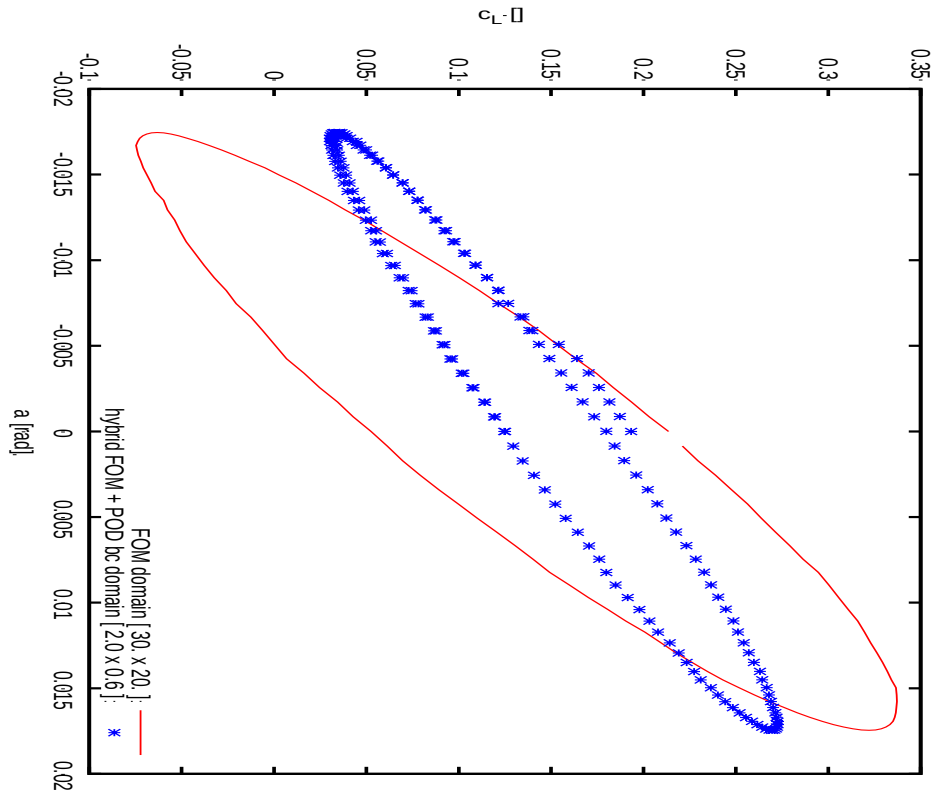


#5



Effect of choice of domain-decomposition





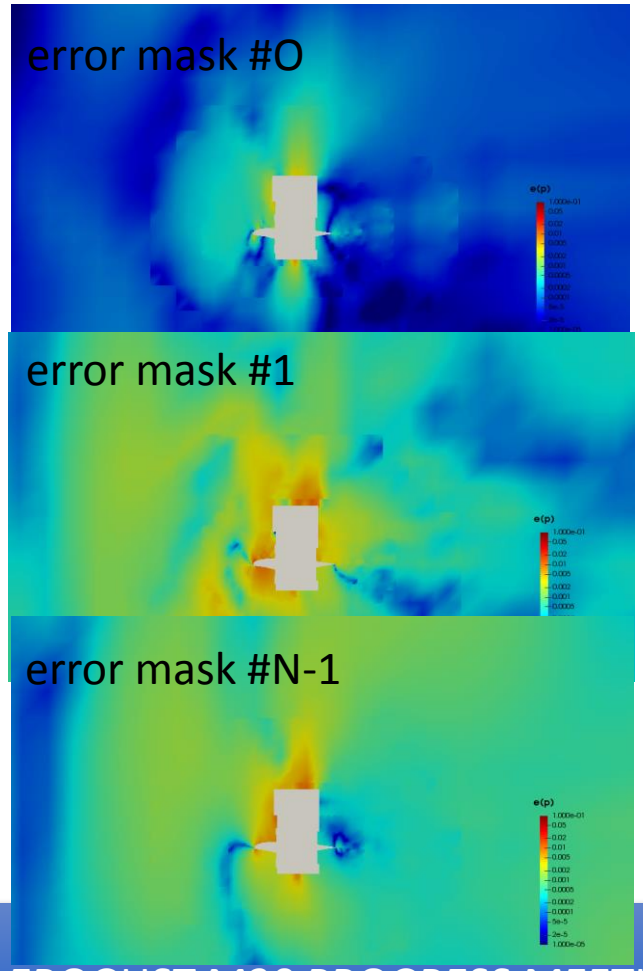
Choice of the interface: cost vs accuracy

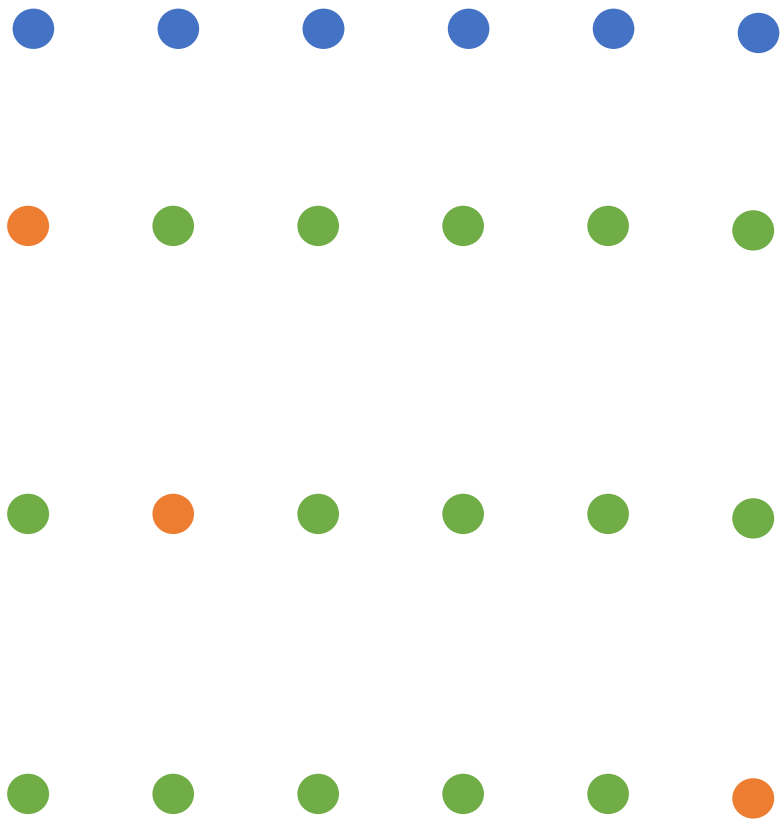
Position of the interface

- CFD domain where the available **snapshots fail to represent the (unknown) solution**
- **fail means: the reconstruction error exceeds a given threshold**

- **if we had the new snapshot, we could calculate this indicator**

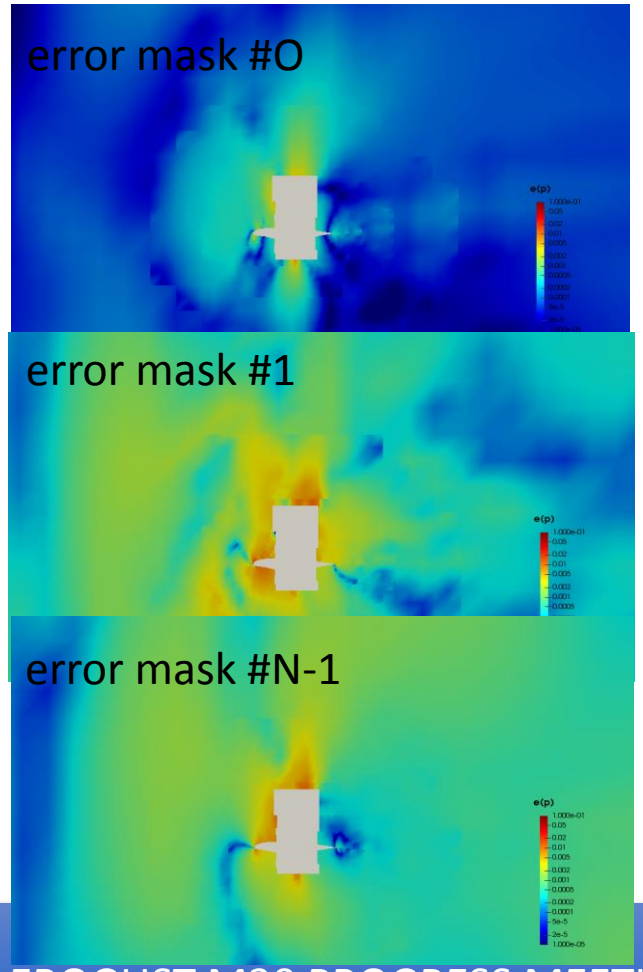
L1O cross correlation





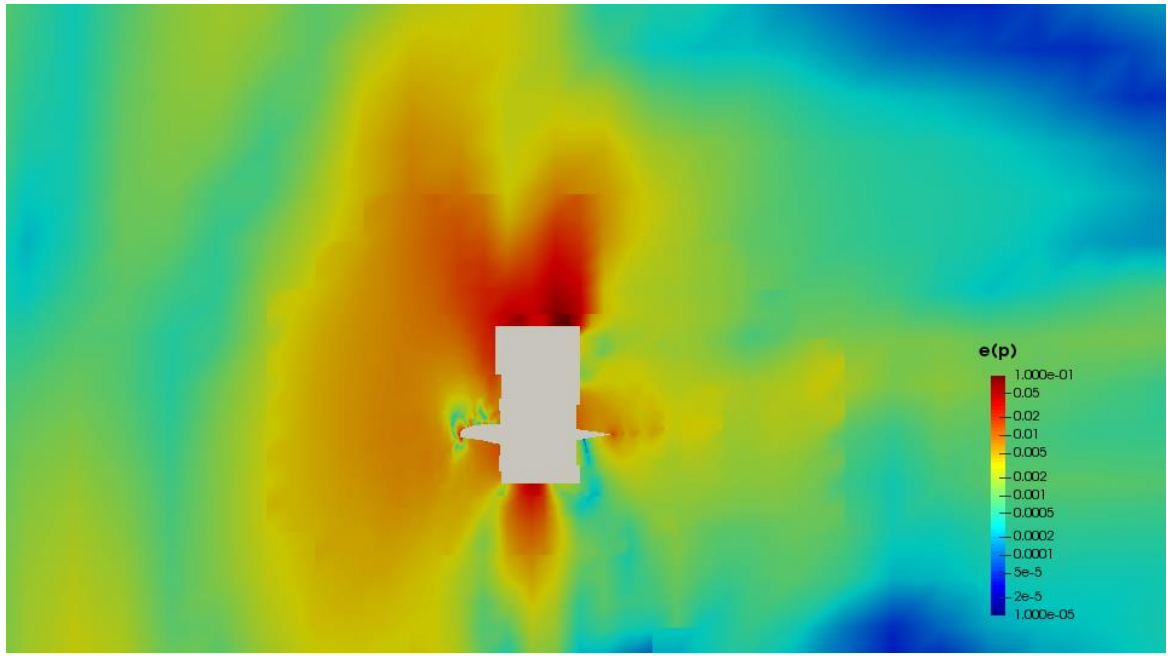
Data base

L1O cross correlation



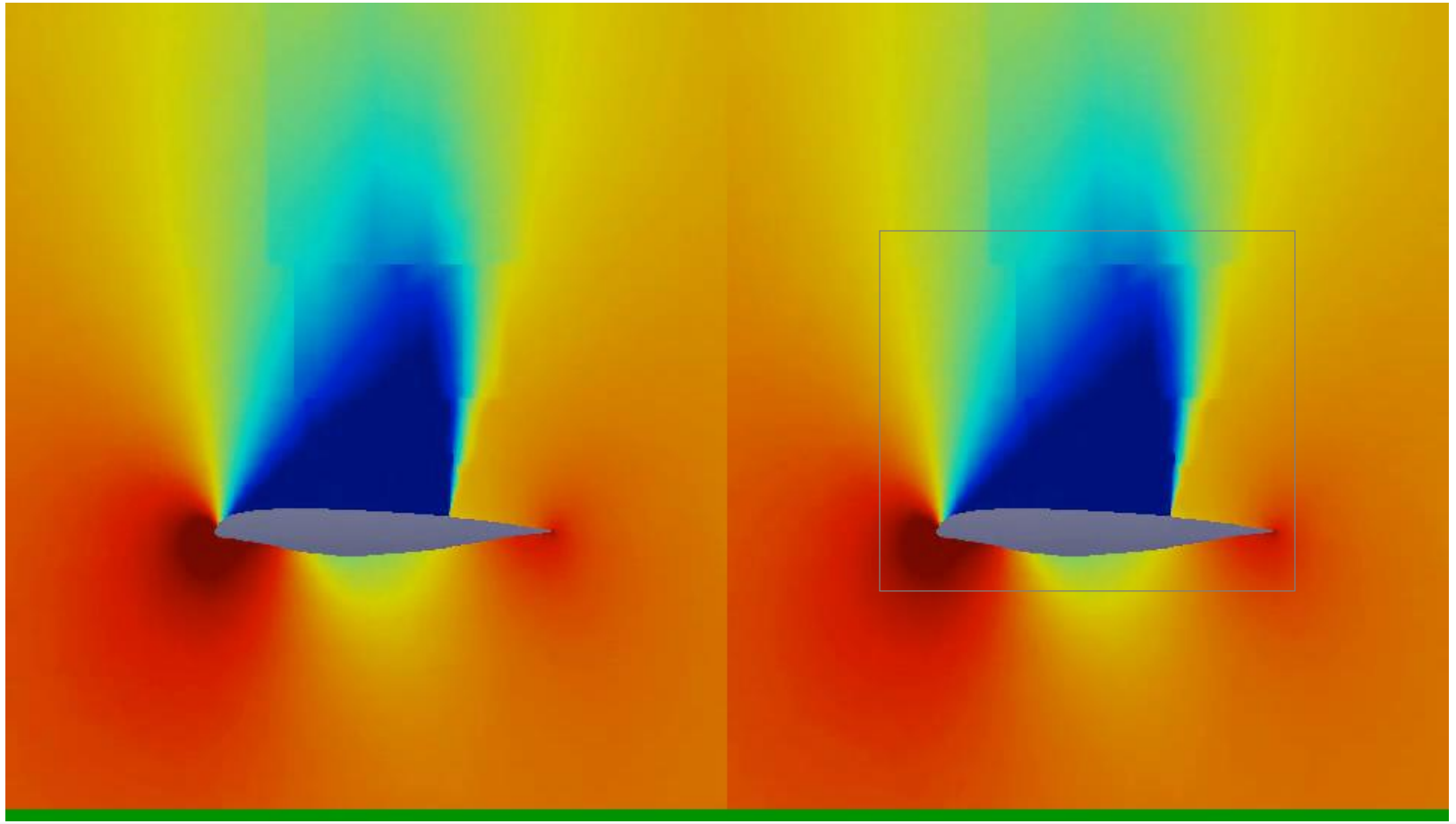
local max()

error mask



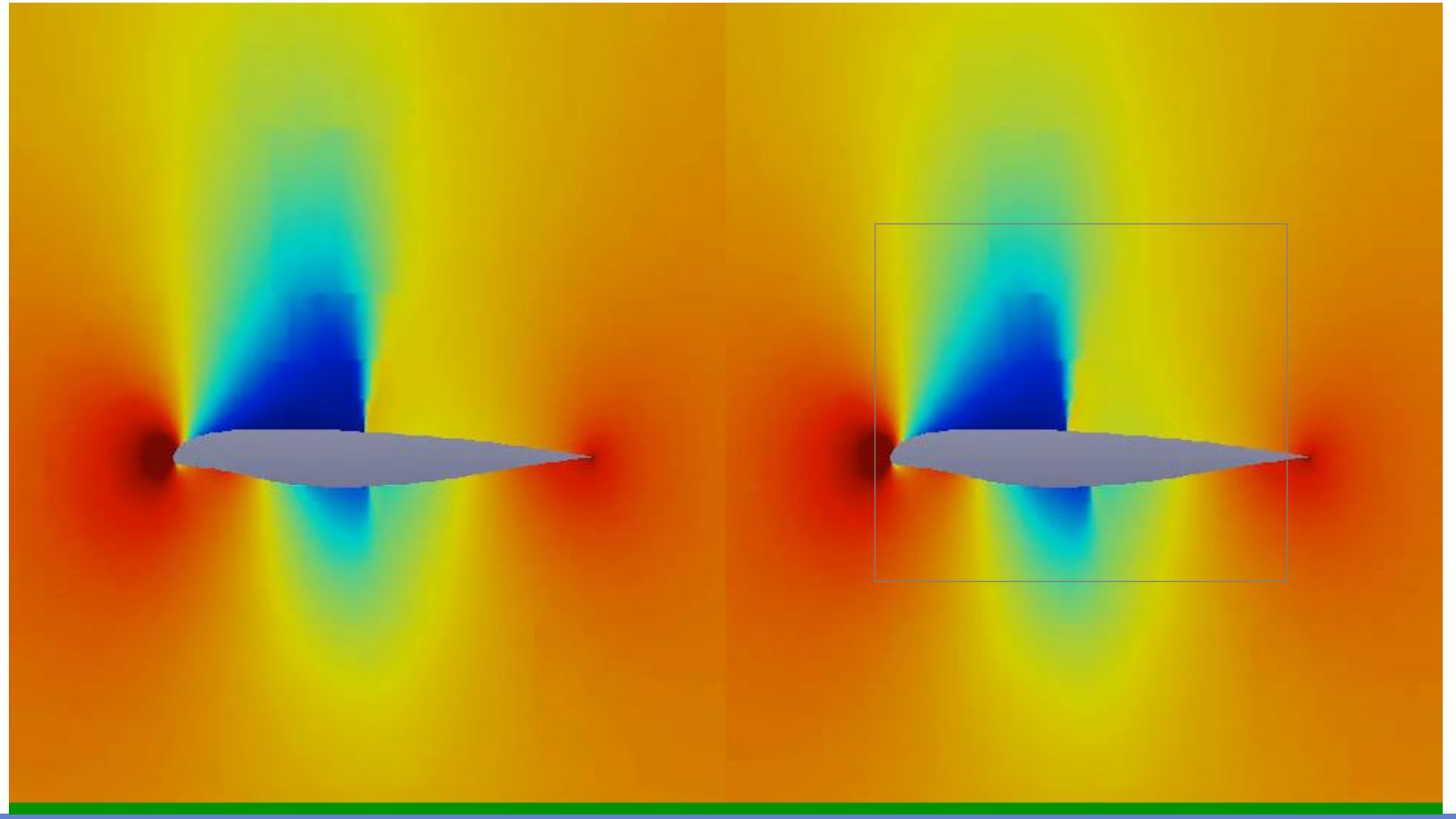
Hybrid simulation (validation)

CFD vs Hybrid simulations @350 (in sample)



Hybrid simulation (prediction)

CFD vs Hybrid simulations @150 (out of sample)



Next Steps

- WP2
  - 3D TC
  - coupling with structures
- WP4
  - Hybrid + adaptive mesh