EPFL

Development of a buffer zone in ORB5

Numerical simulations

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Buffer Model and simulation set-up

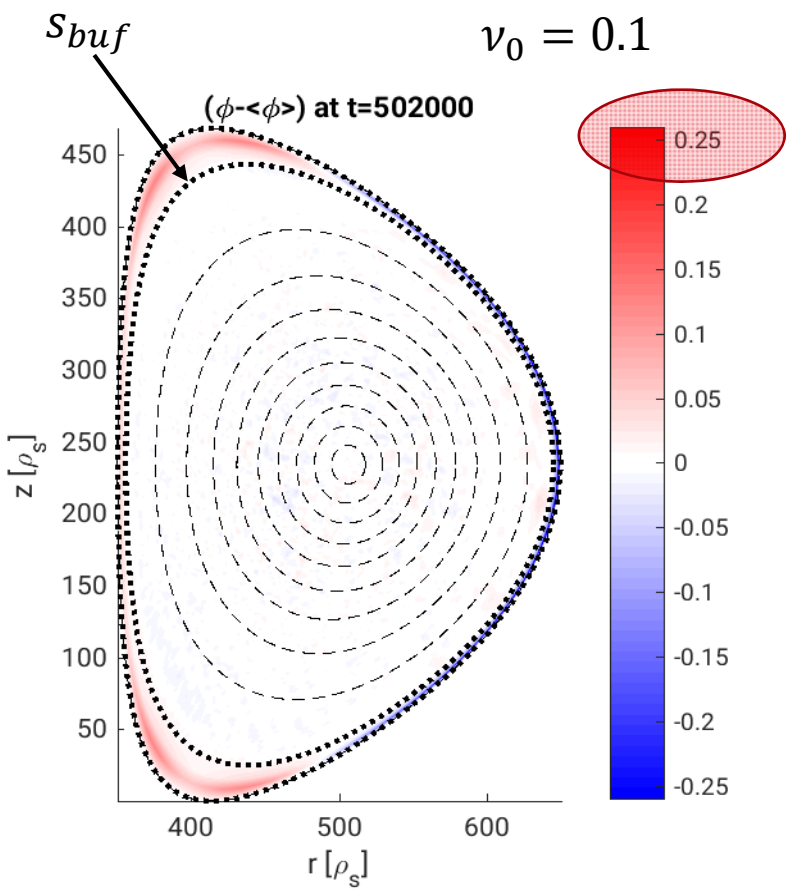
- Simulations – decaying turbulence (no source in the core), adiabatic electrons, with collisions
  - Varying the position and the damping strength in the buffer

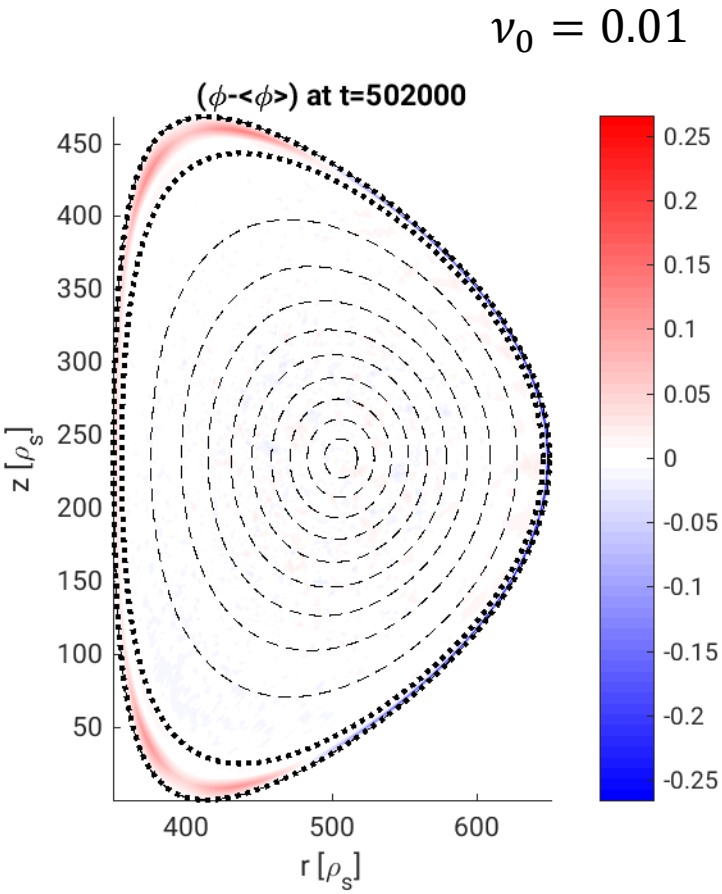
$$\frac{\partial}{\partial t}(\delta F) = -\nu(s)\delta F + \mathrm{C}(s)$$

$$\nu(s) = \nu_0 \left(\frac{s - s_{buf}}{s_{max} - s_{buf}} \right)^2$$

Buffer behaviour(1)

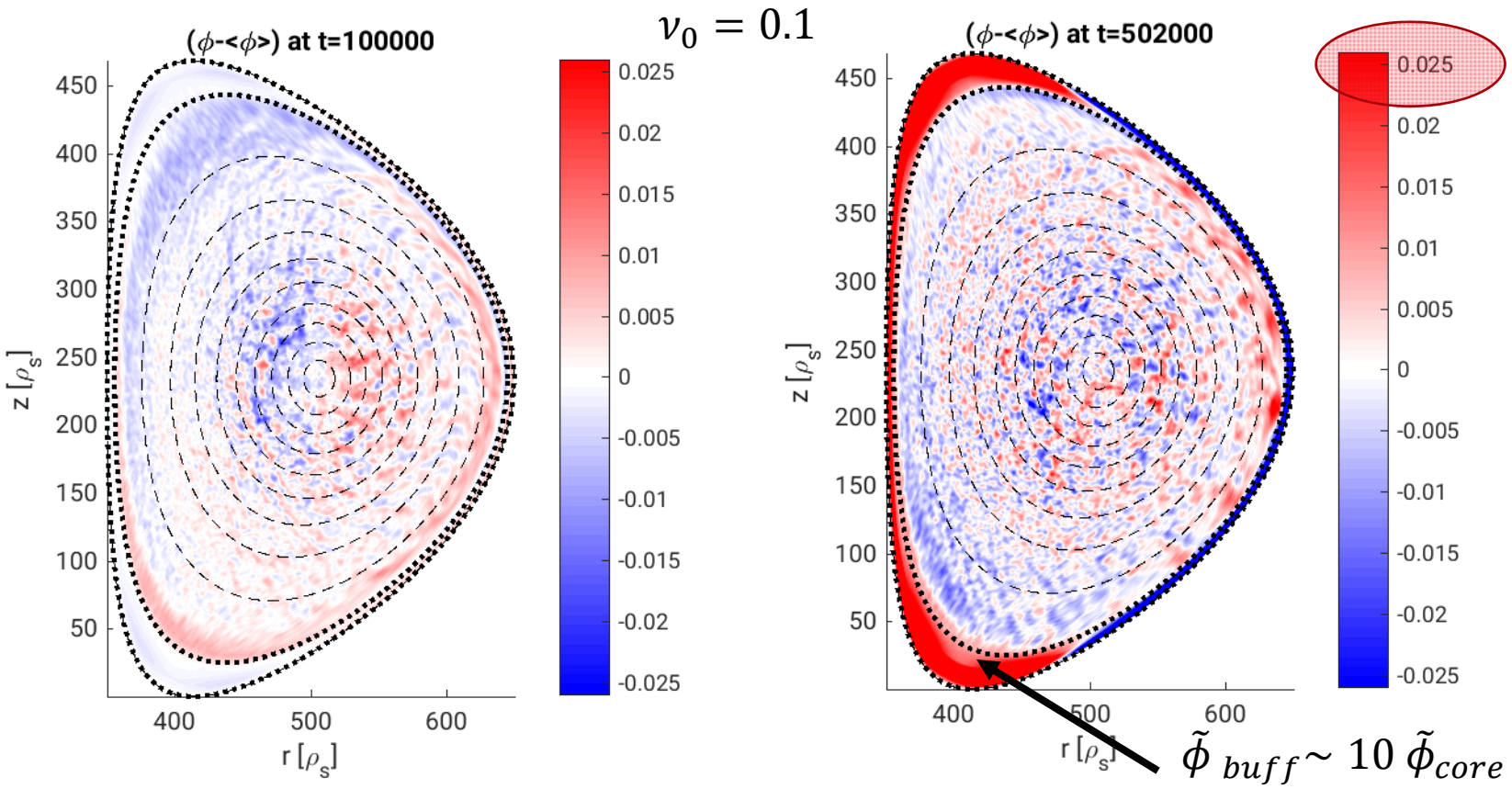
- Long time behaviour issue:
  - Buffer accumulates the fluctuations



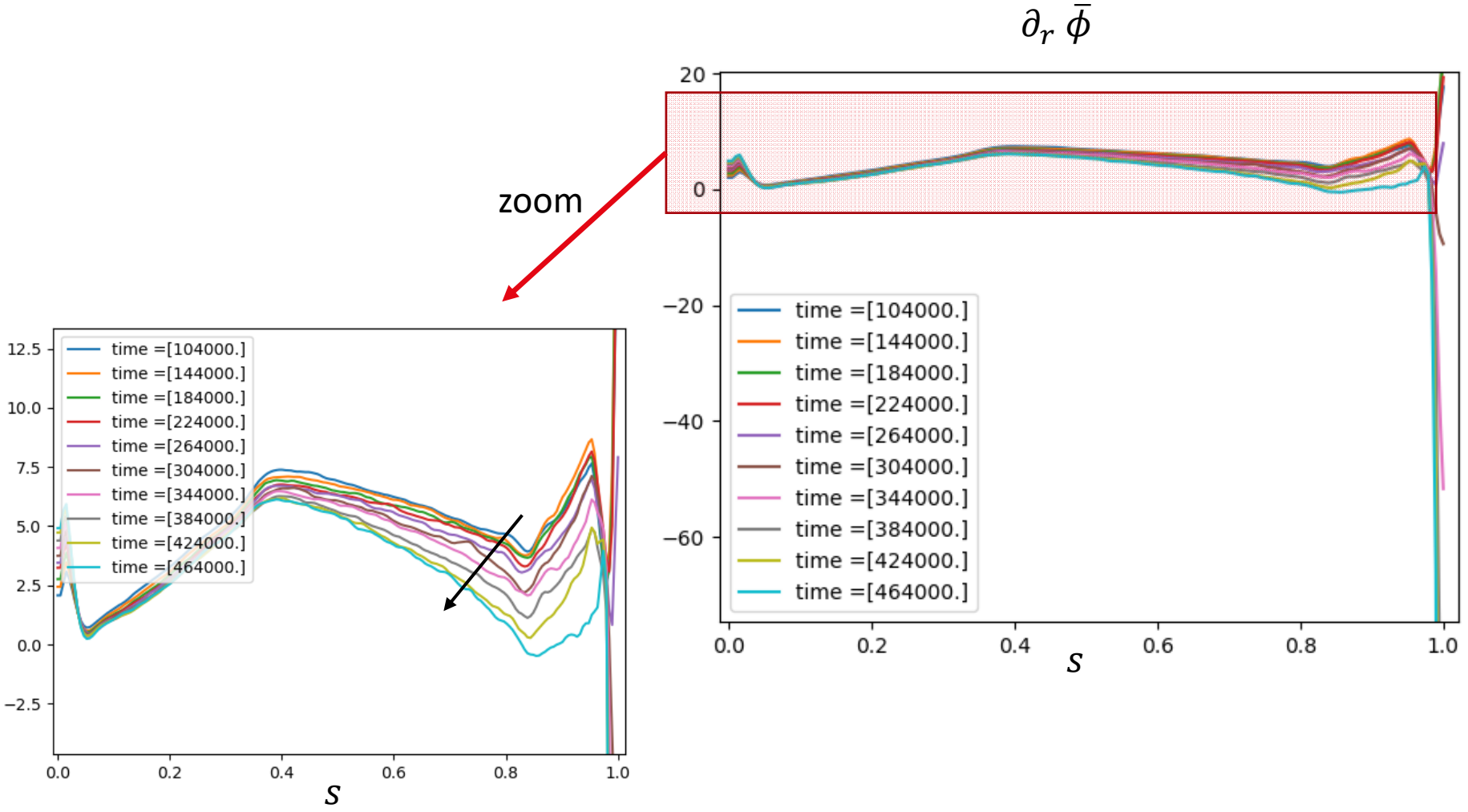


Buffer behaviour(2)

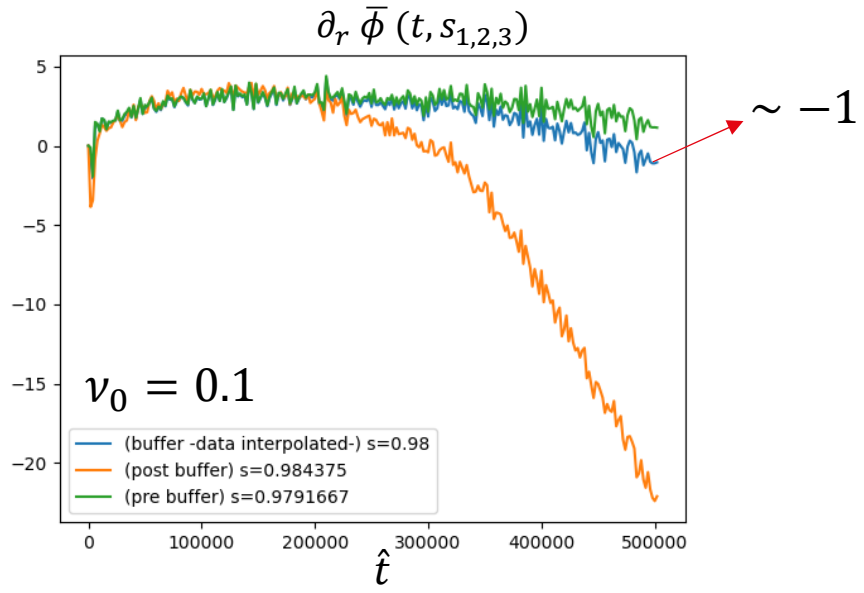
- Fluctuations at the core do not change
- Increasing of the potiantial on the buffer and strong development of electric field at the buffer-core interface



Electric field



Radial electric field – buffer interface -



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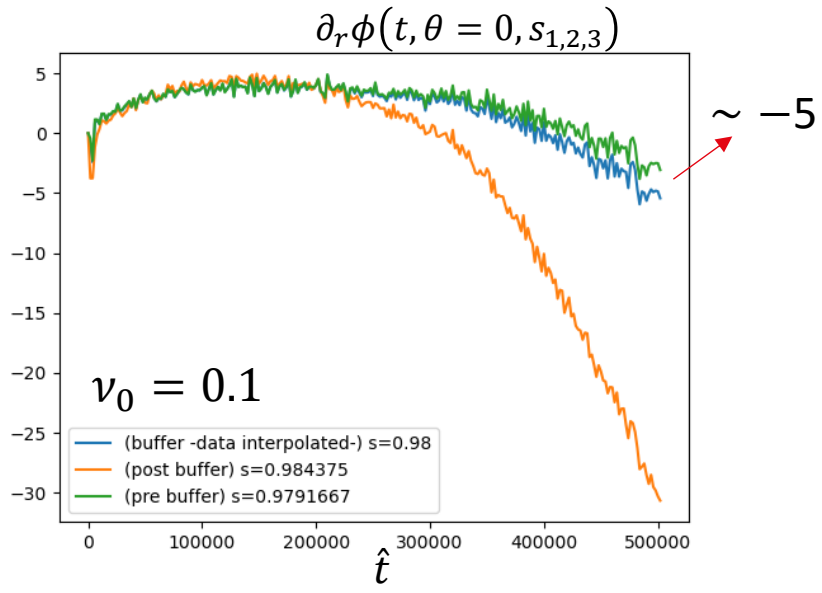

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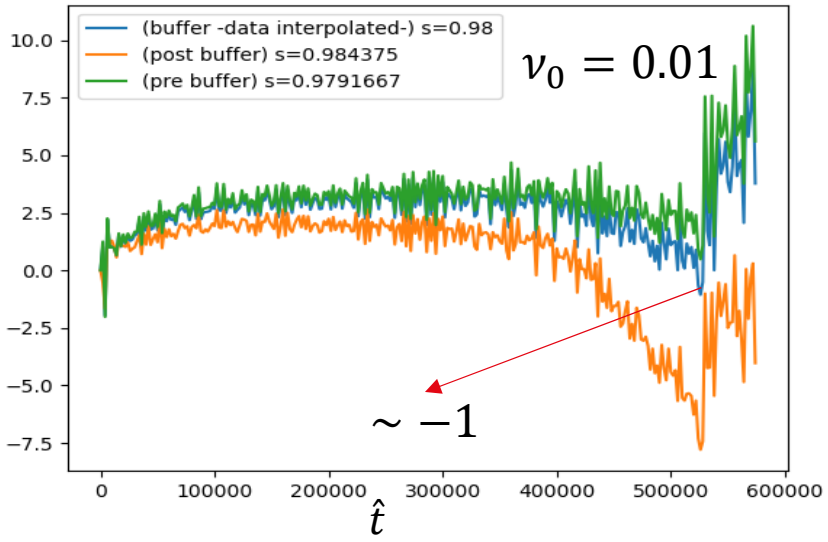
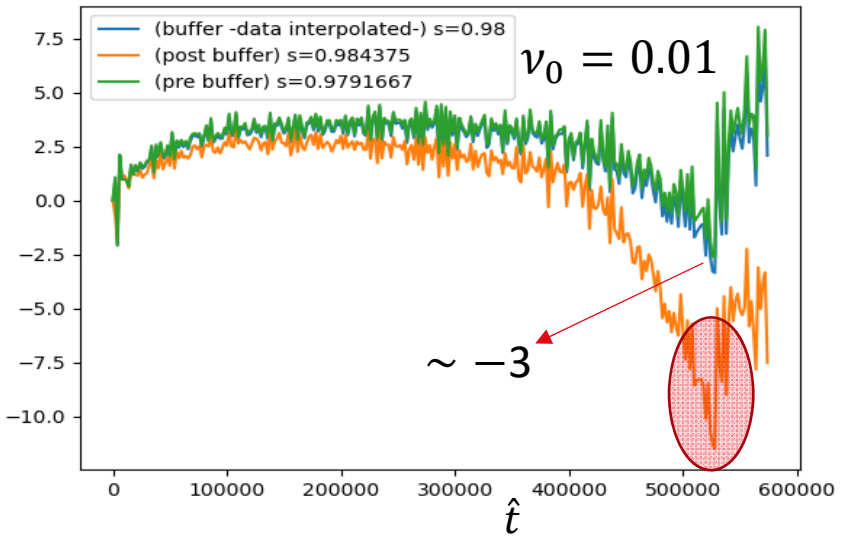
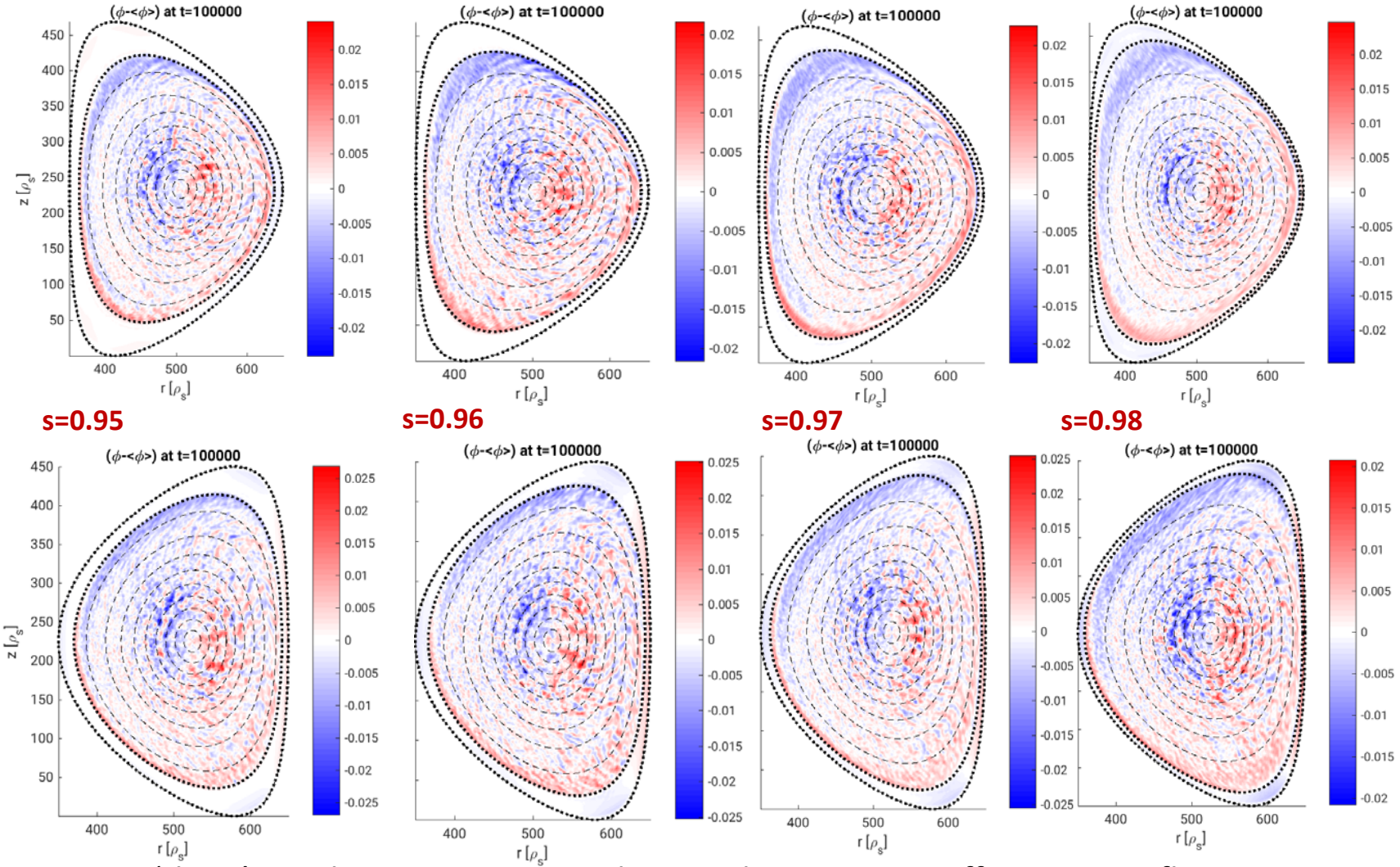




Dependence on buffer position ($\nu_0 = 1$)



For ‘short’ simulations position and triangularity are not affecting core fluctuations (with adiabatic electrons)

Future work

- Study the impact of physical parameters (power, collisionality, gradients, magnetic geometry, kinetic electrons…) on the development of the electric field
- Comparison between gyrokinetic simulation vs experiments
- Concluding the scan in position and strength