



# New Case2 committee meshes for AutoCFD-5

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# Summary of new meshes for AutoCFD-5

- Redistribution of refinement zones aimed at:
  - Further refinement of surface curvatures
  - Further refinement of important flow regions
  - Coarsening of unnecessarily refined areas
  - Use of fewer Size Boxes and rely more on Surface Offset and Sweep rules
- Reduction of total number of layers from 7 to 5
- Minor PID name modifications and addition of one new PID (please check your previous CFD setups)
- Overall ~22% reduction in cell count
- Addition of an Estate version mesh
- Better quality criteria for more CFD solvers

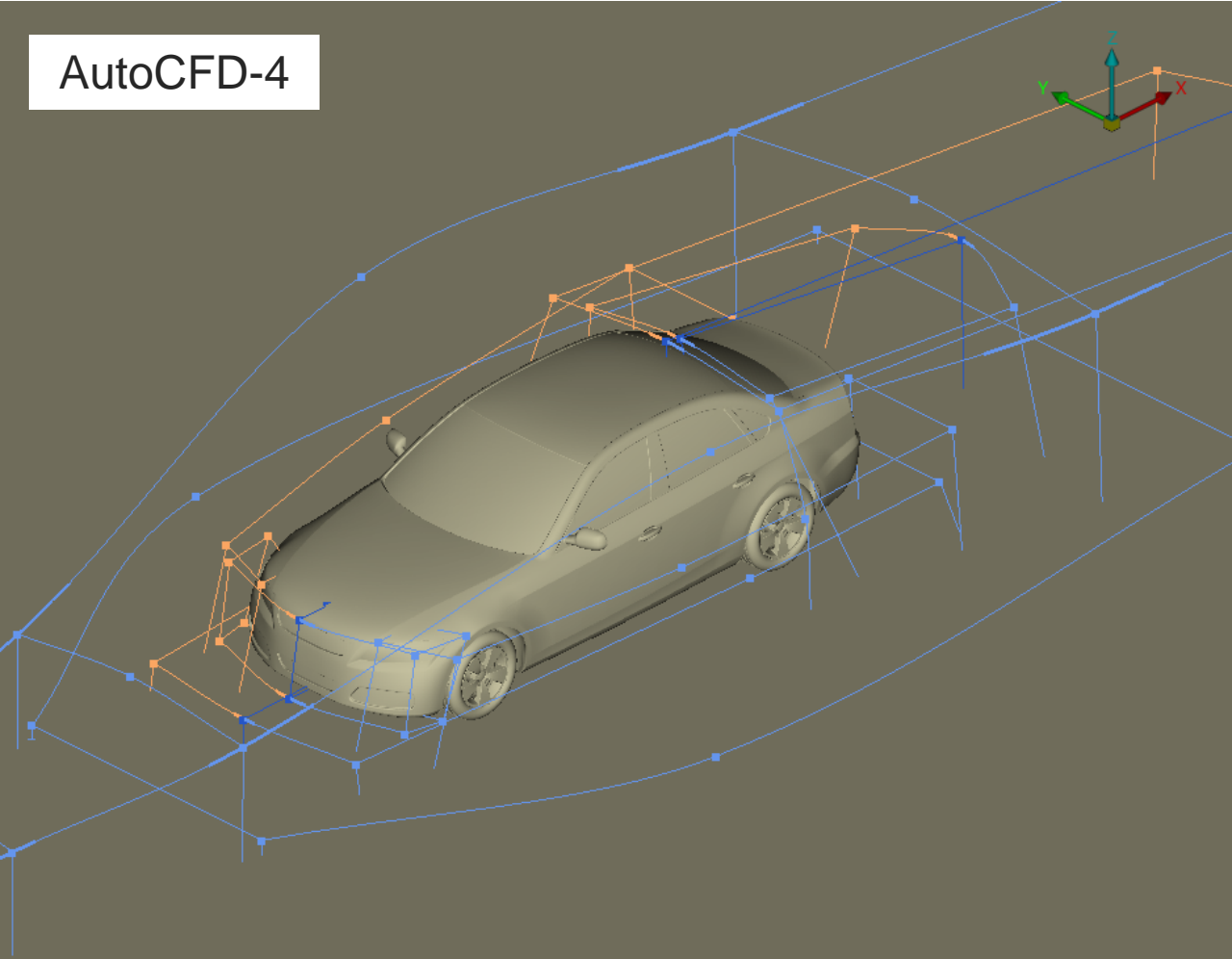
# Summary of new meshes for AutoCFD-5

	AutoCFD-4 (ANSA v24.1.3)		AutoCFD-5 (ANSA 2025.2.0)		
	Case 2a Notchback	Case 2b (deflector) Notchback	Case 2a Notchback	Case 2b (deflector) Notchback	Case 2c (?) Estate
Number of shell elements (million)	11.2	11.3	<b>10.3</b>	<b>10.4</b>	<b>10.4</b>
Number of vol elements (million)	157	158	<b>123</b>	<b>126</b>	<b>124</b>
First layer height (mm)	0.75		<b>0.75</b>		
Number of viscous layers	7		<b>5</b>		
Growth rate	1.2 – 1.4 variable		<b>1.2 – 1.4 variable</b>		

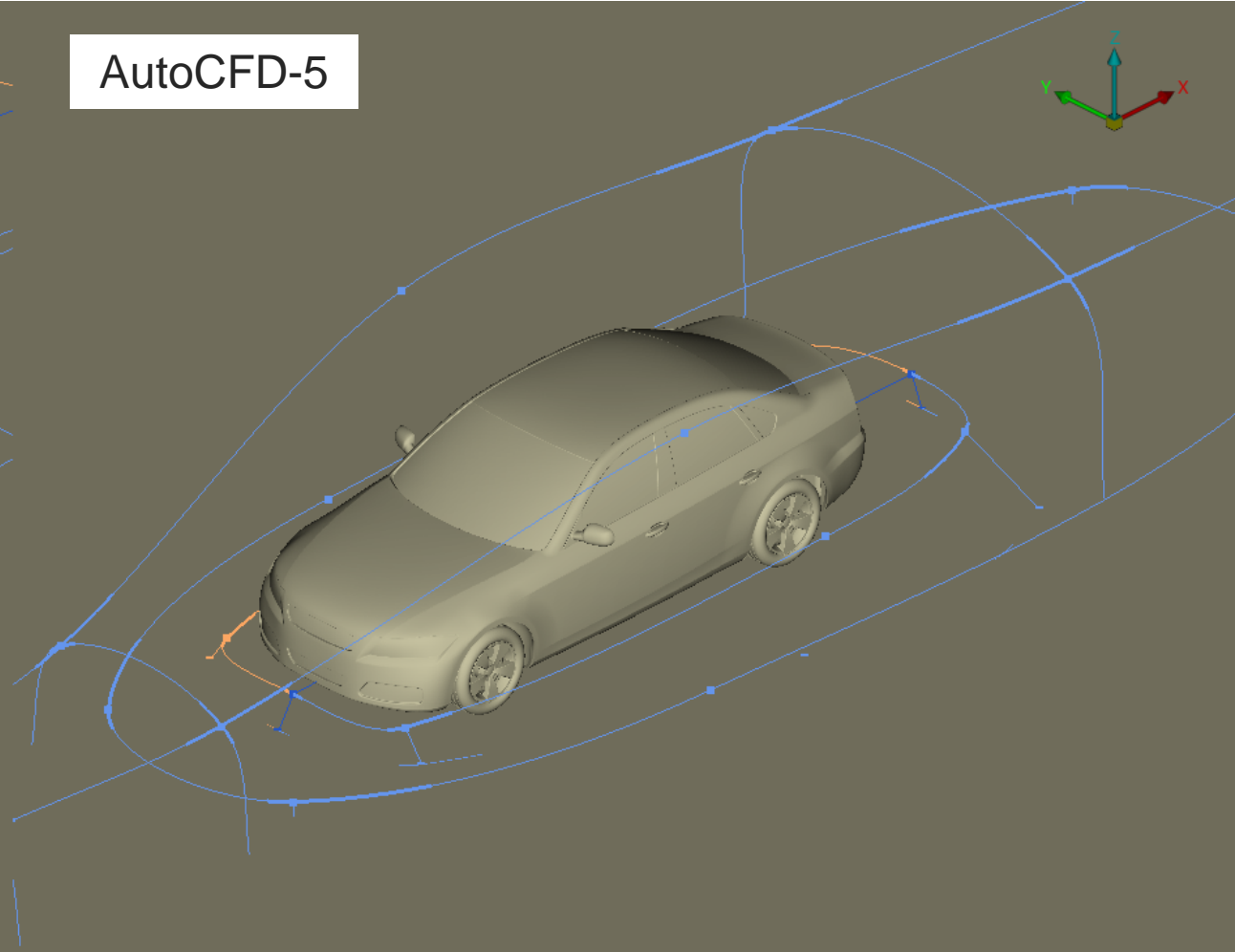
Speed: ~30min on AMD Ryzen  
threadripper PRO 9995WX – 96 cores

# Simplification of Size Boxes

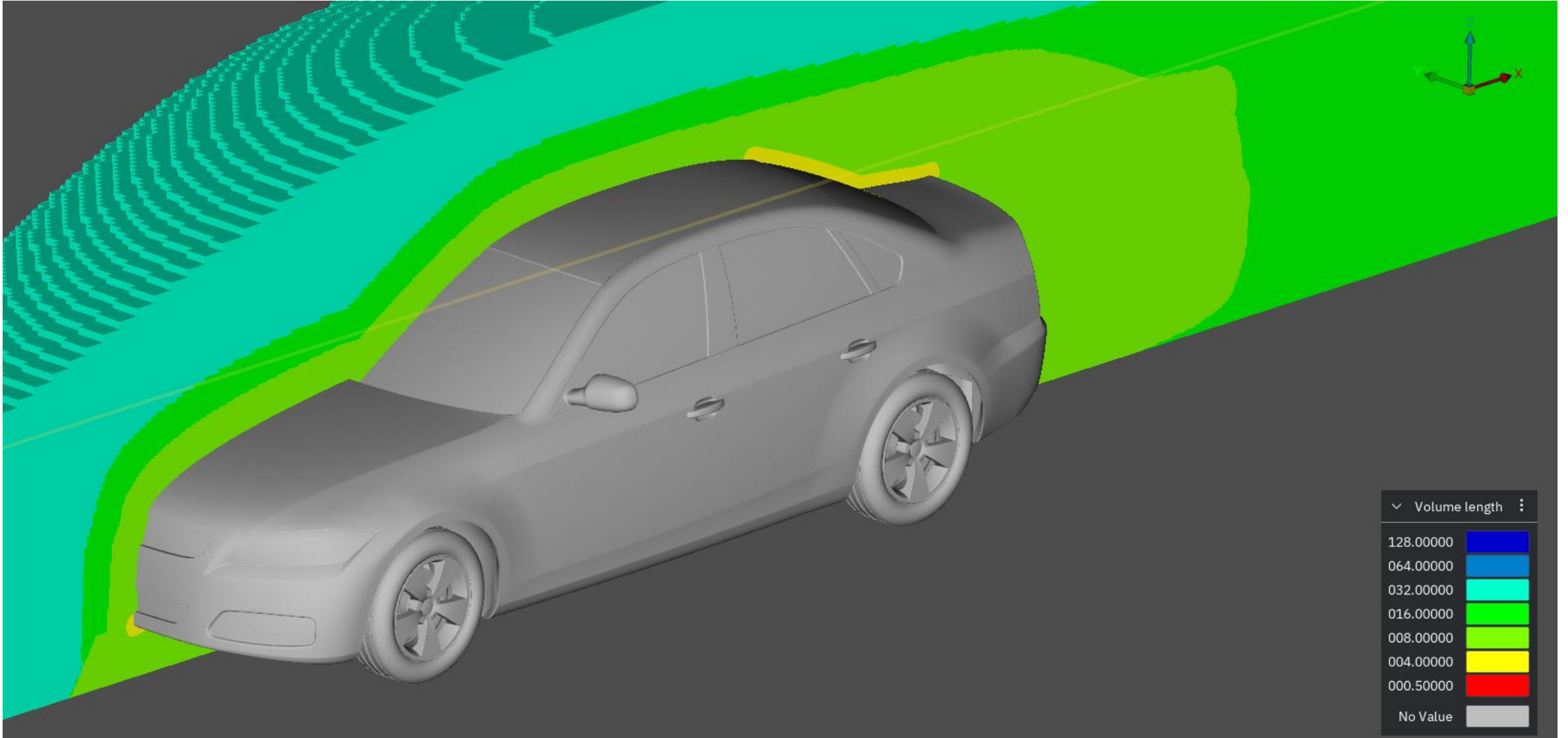
AutoCFD-4



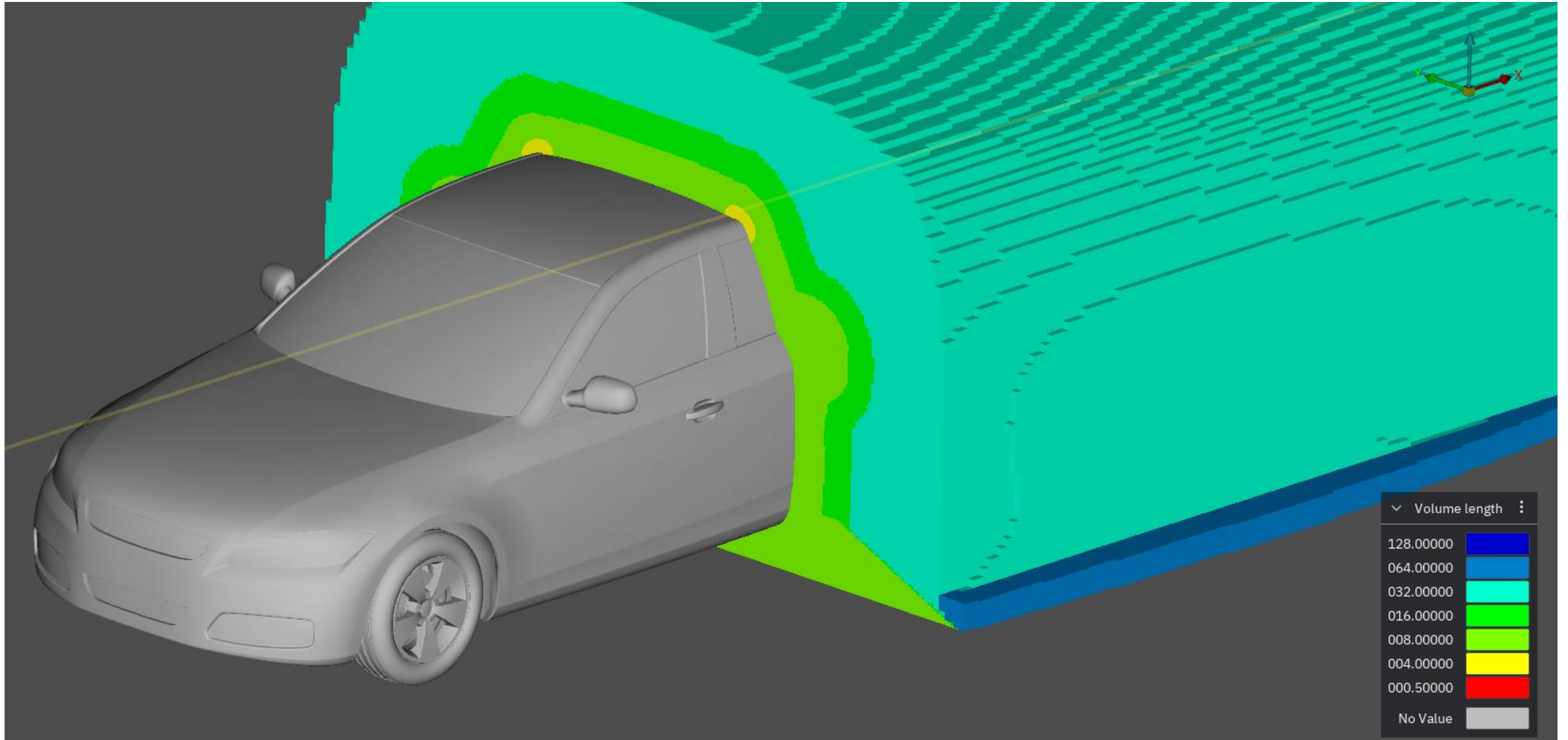
AutoCFD-5



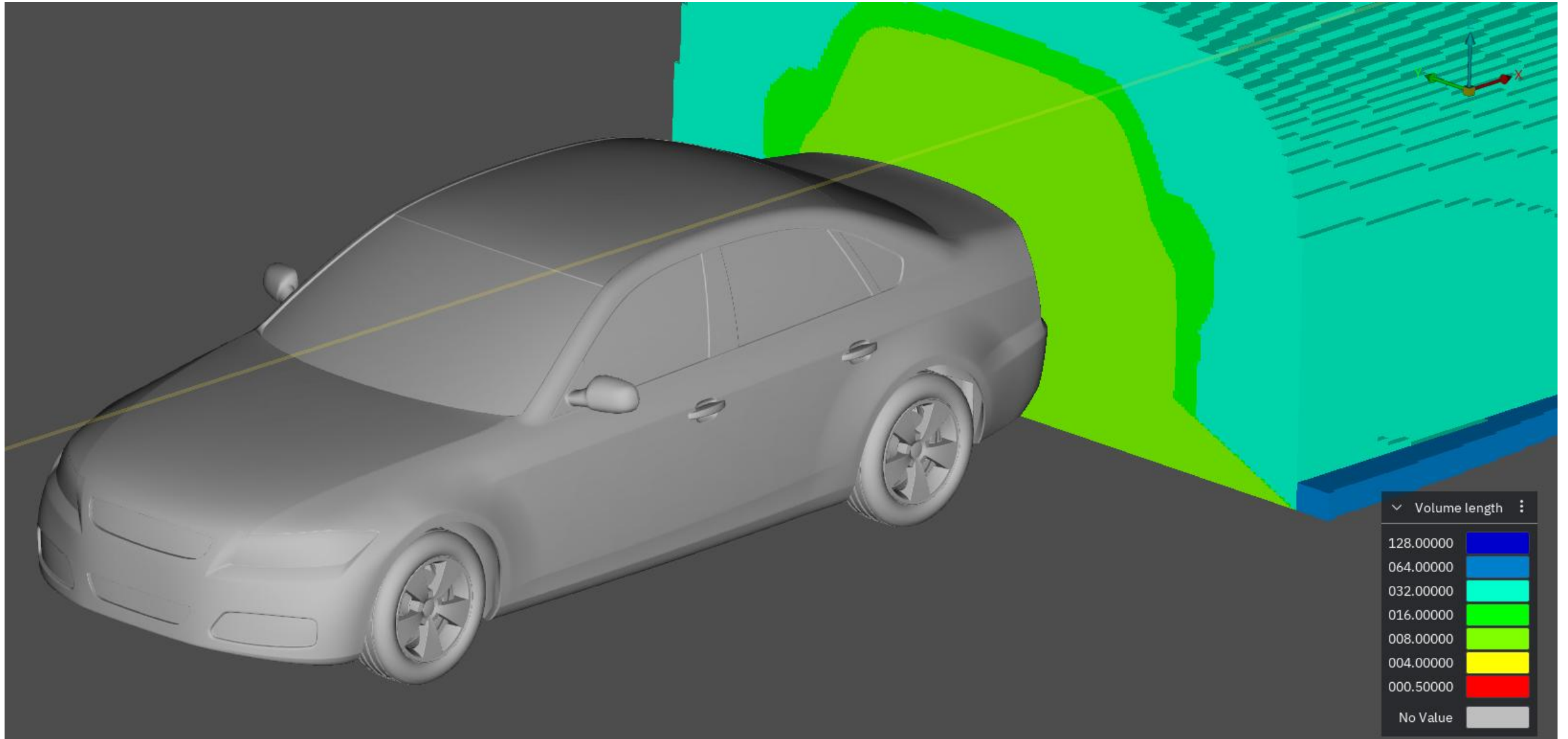
# New setup relies more on Surface Offset and sweep size rules



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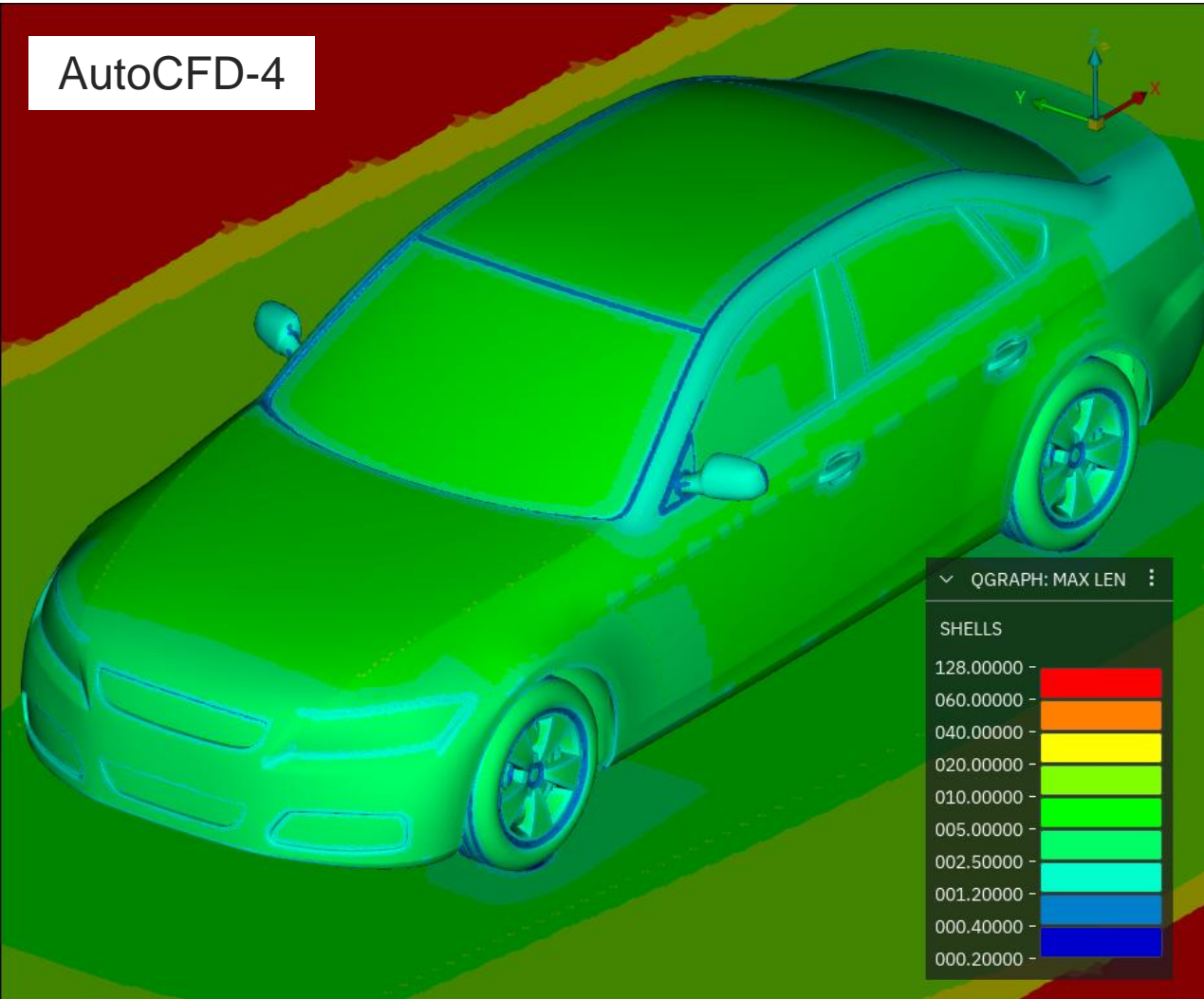


# New setup relies more on Surface Offset and sweep size rules

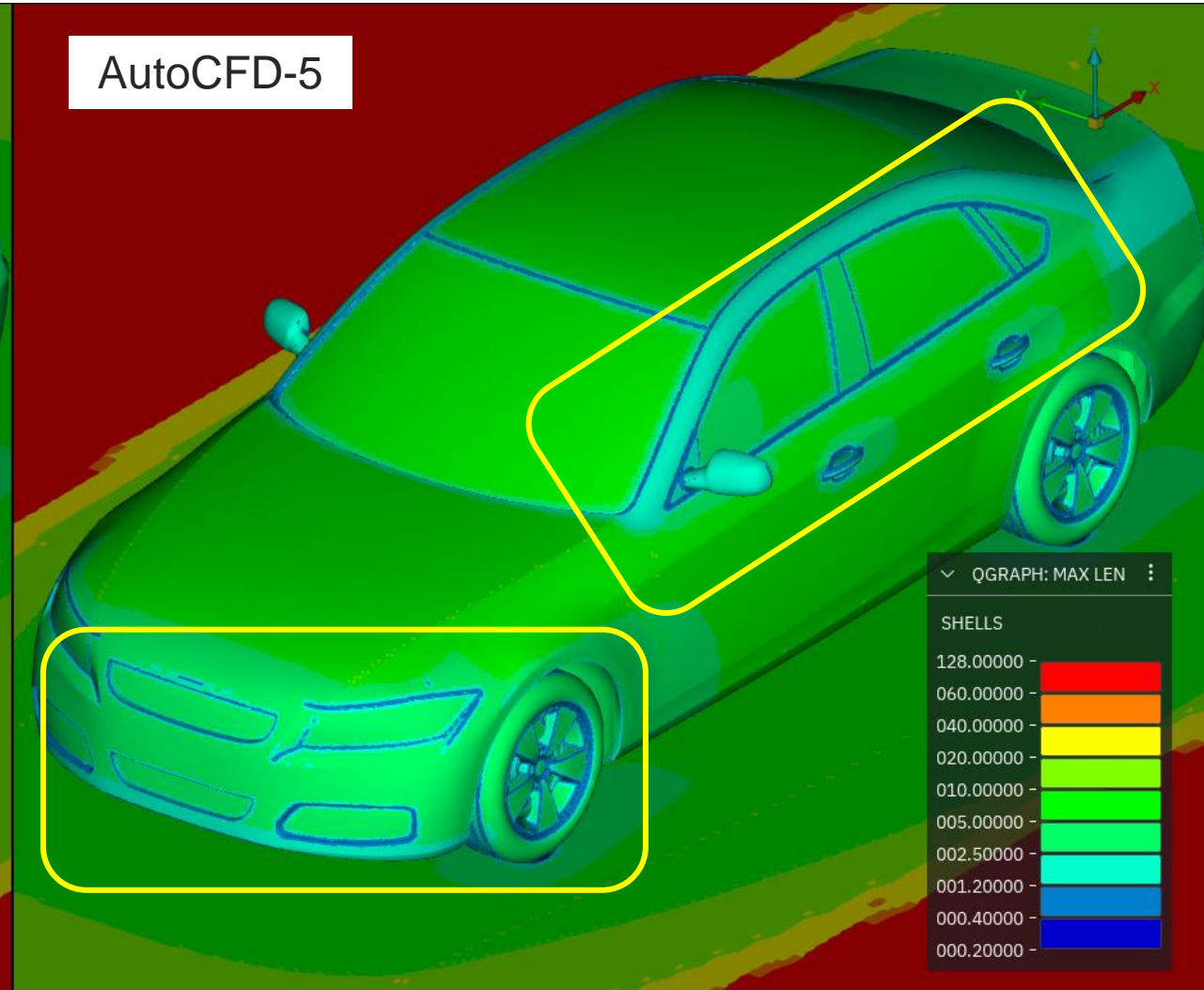


# Surface mesh size contour plot (mm)

AutoCFD-4



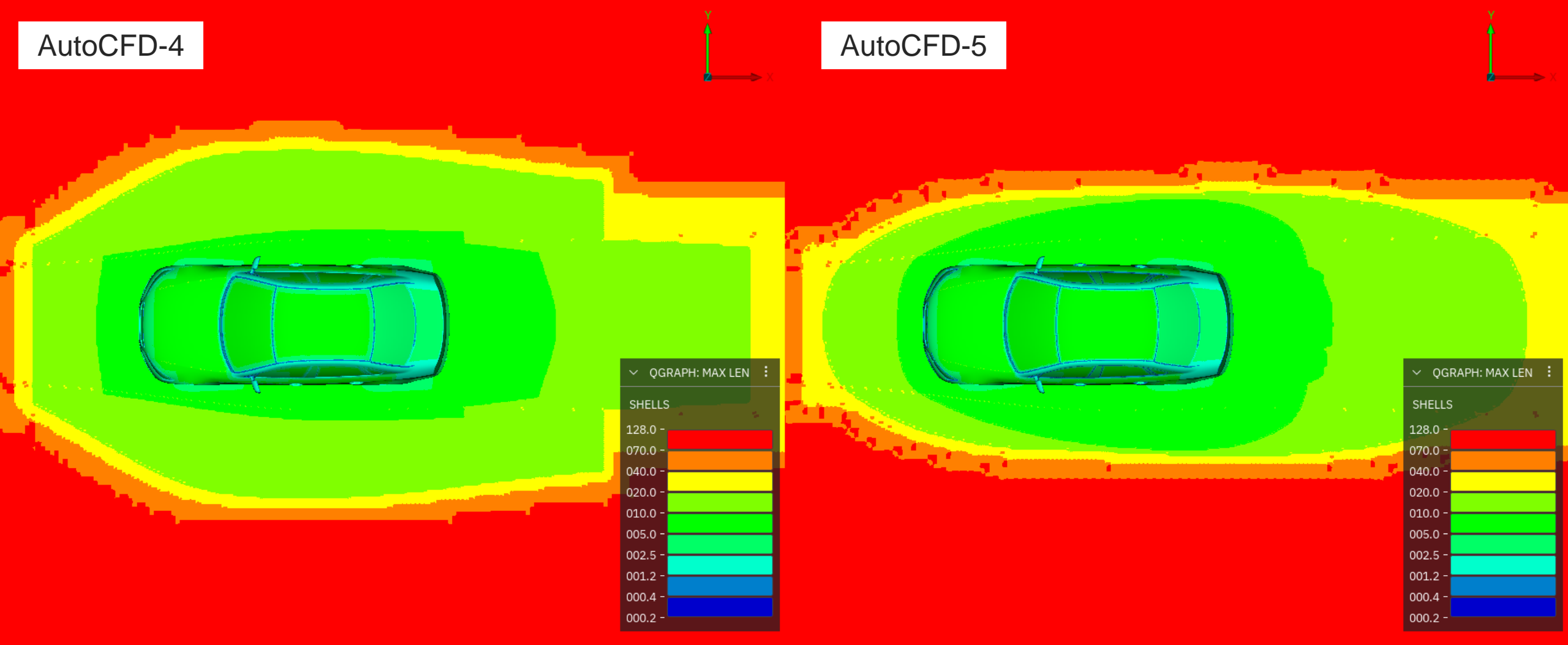
AutoCFD-5



# Surface mesh size contour plot (mm)

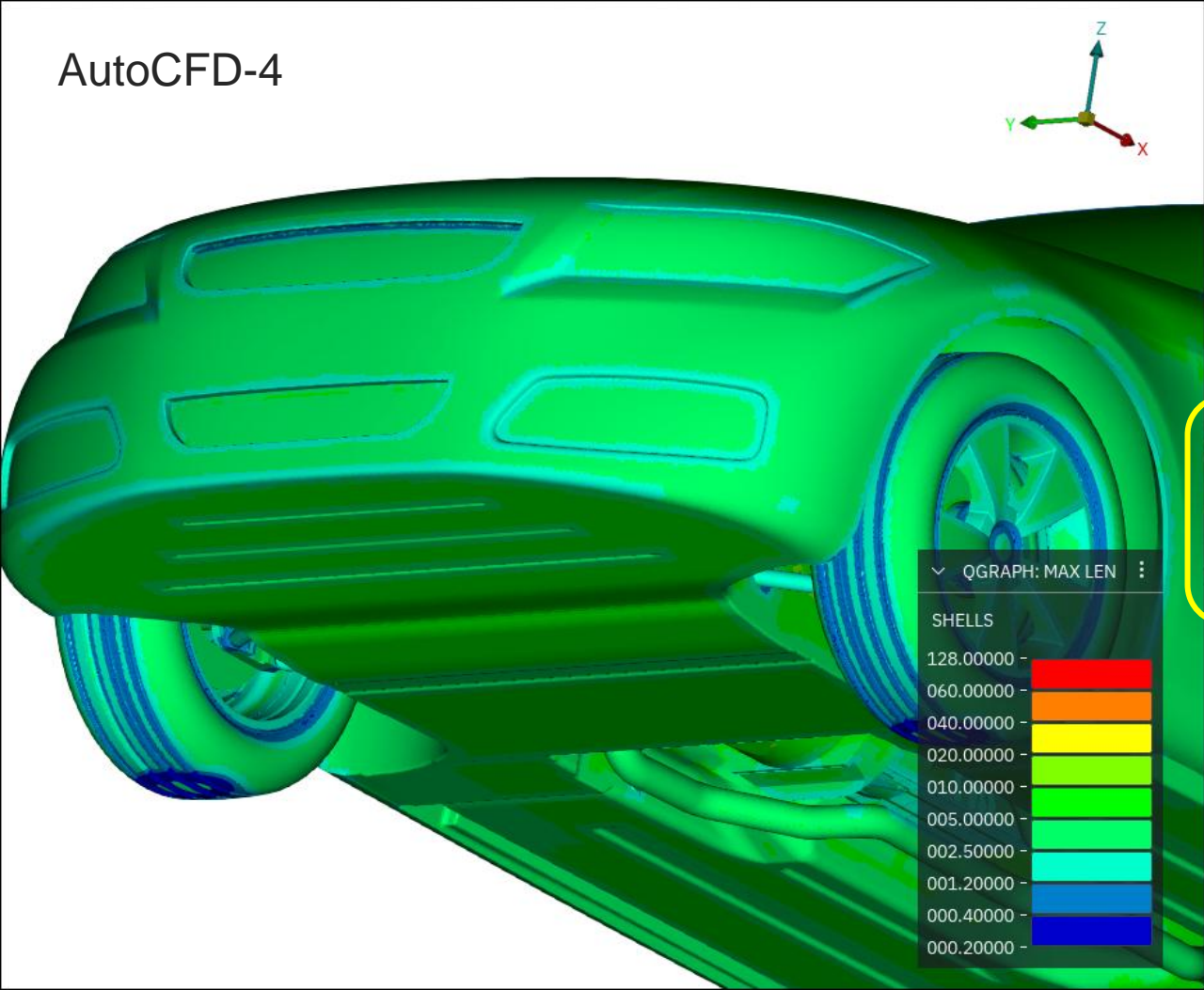
AutoCFD-4

AutoCFD-5

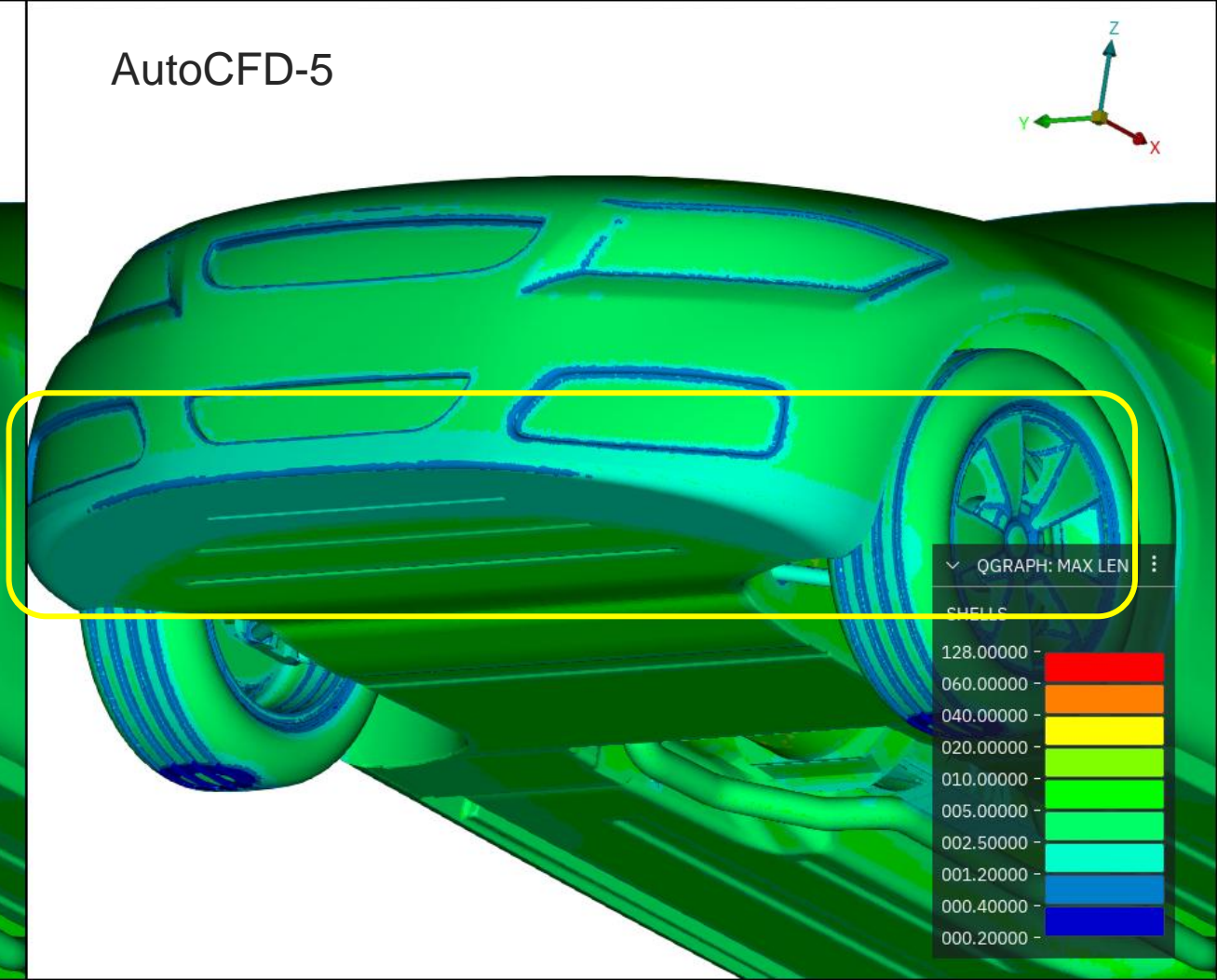


# Surface mesh size contour plot (mm)

AutoCFD-4

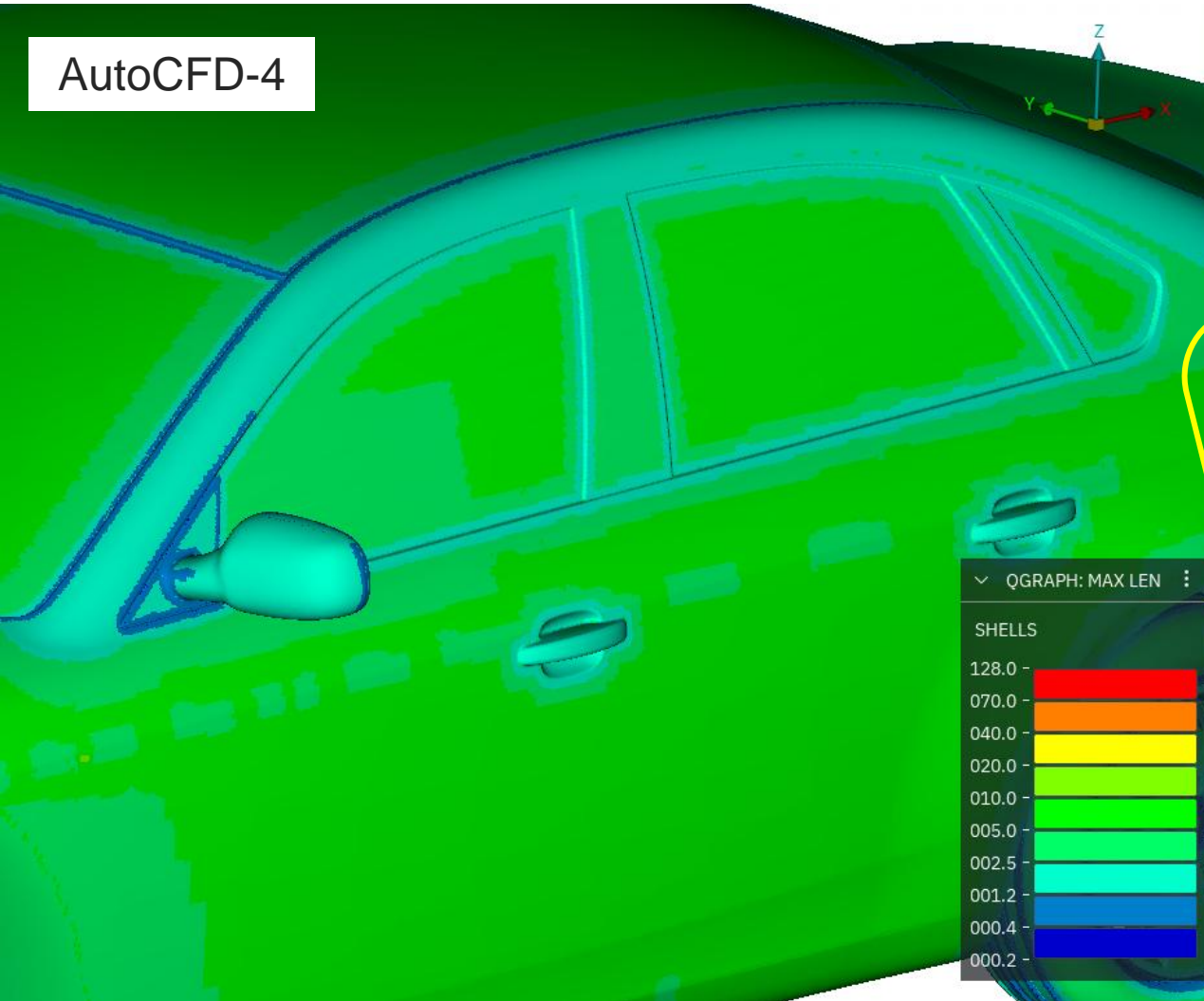


AutoCFD-5

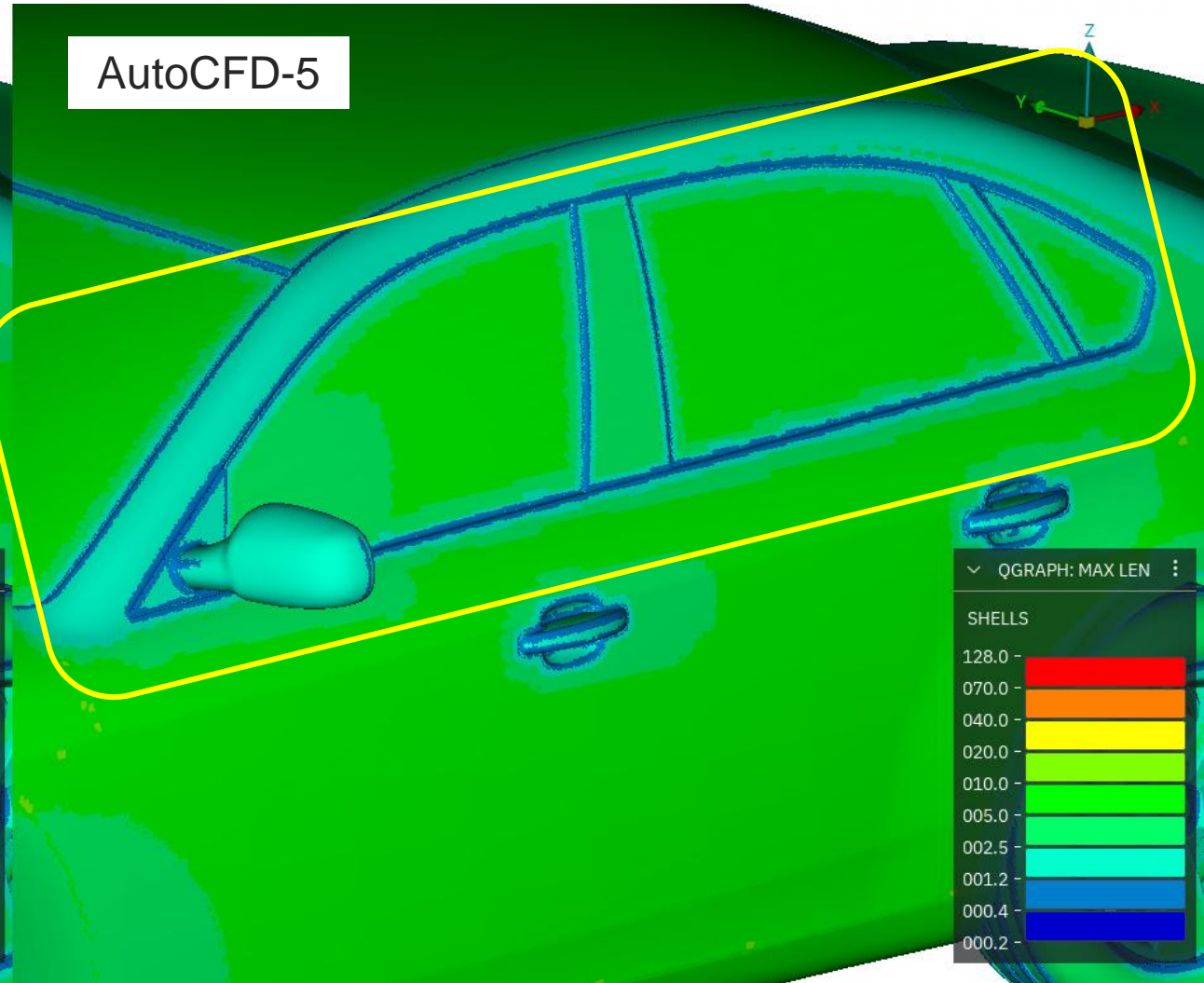


# Surface mesh size contour plot (mm)

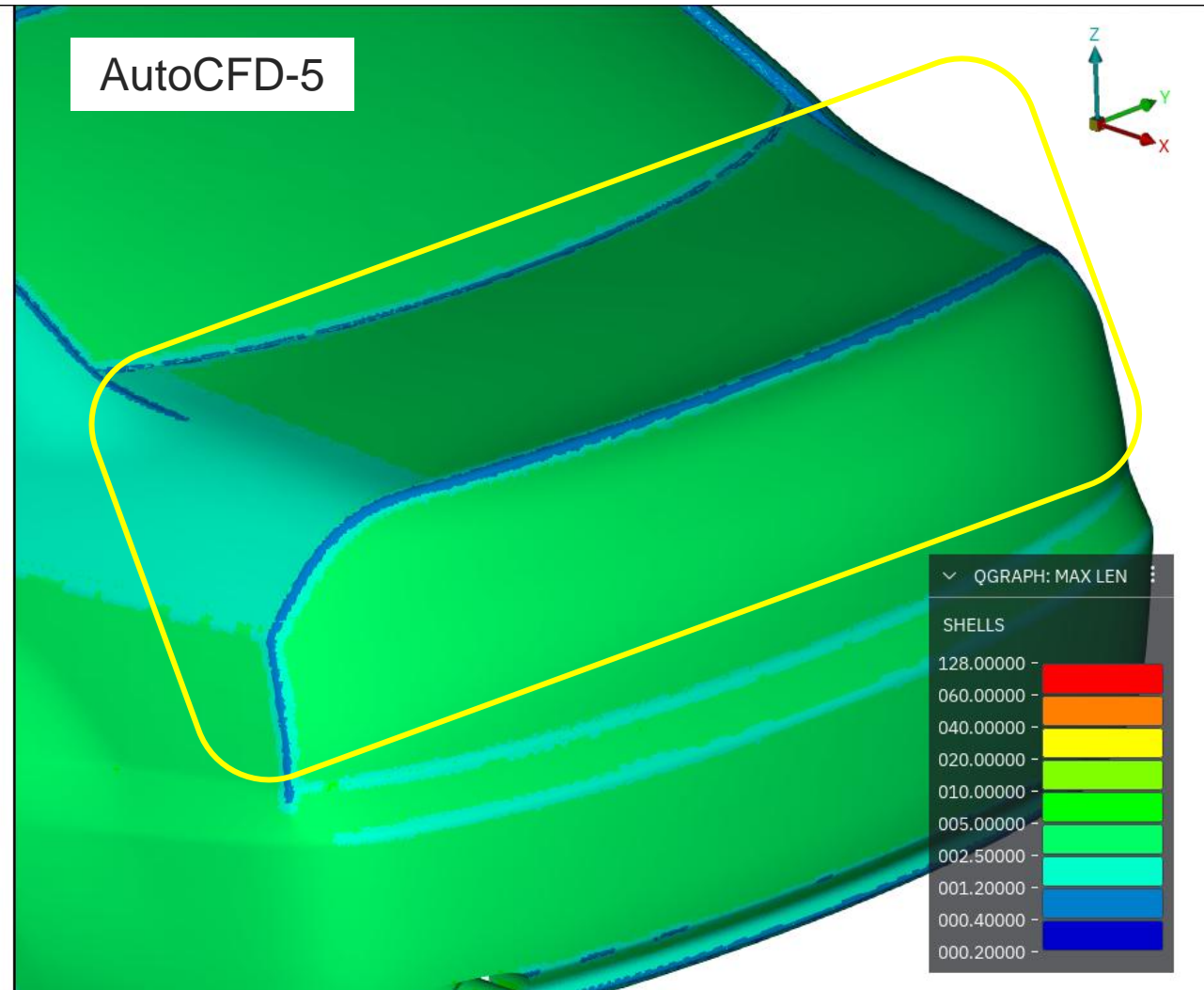
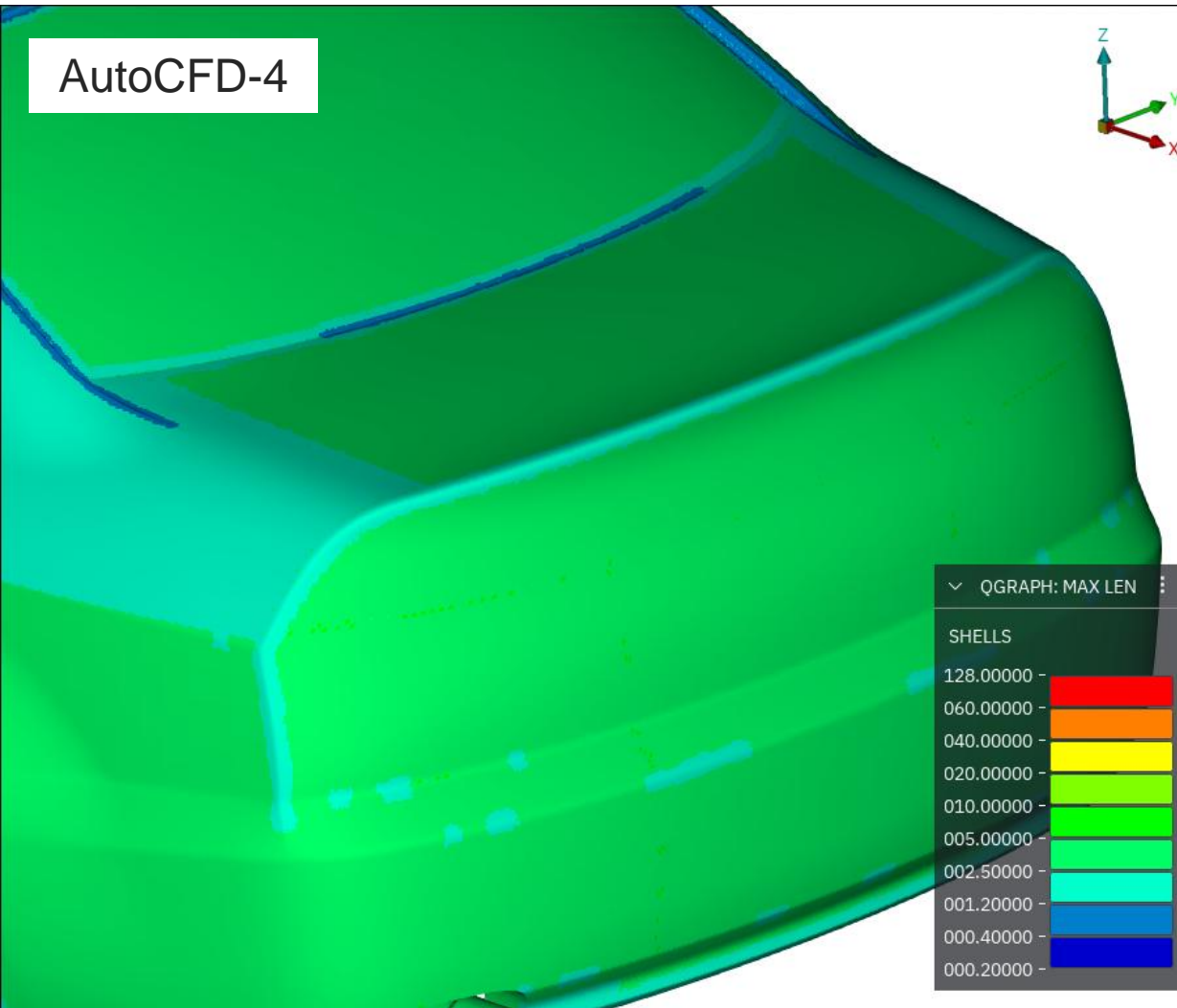
AutoCFD-4



AutoCFD-5

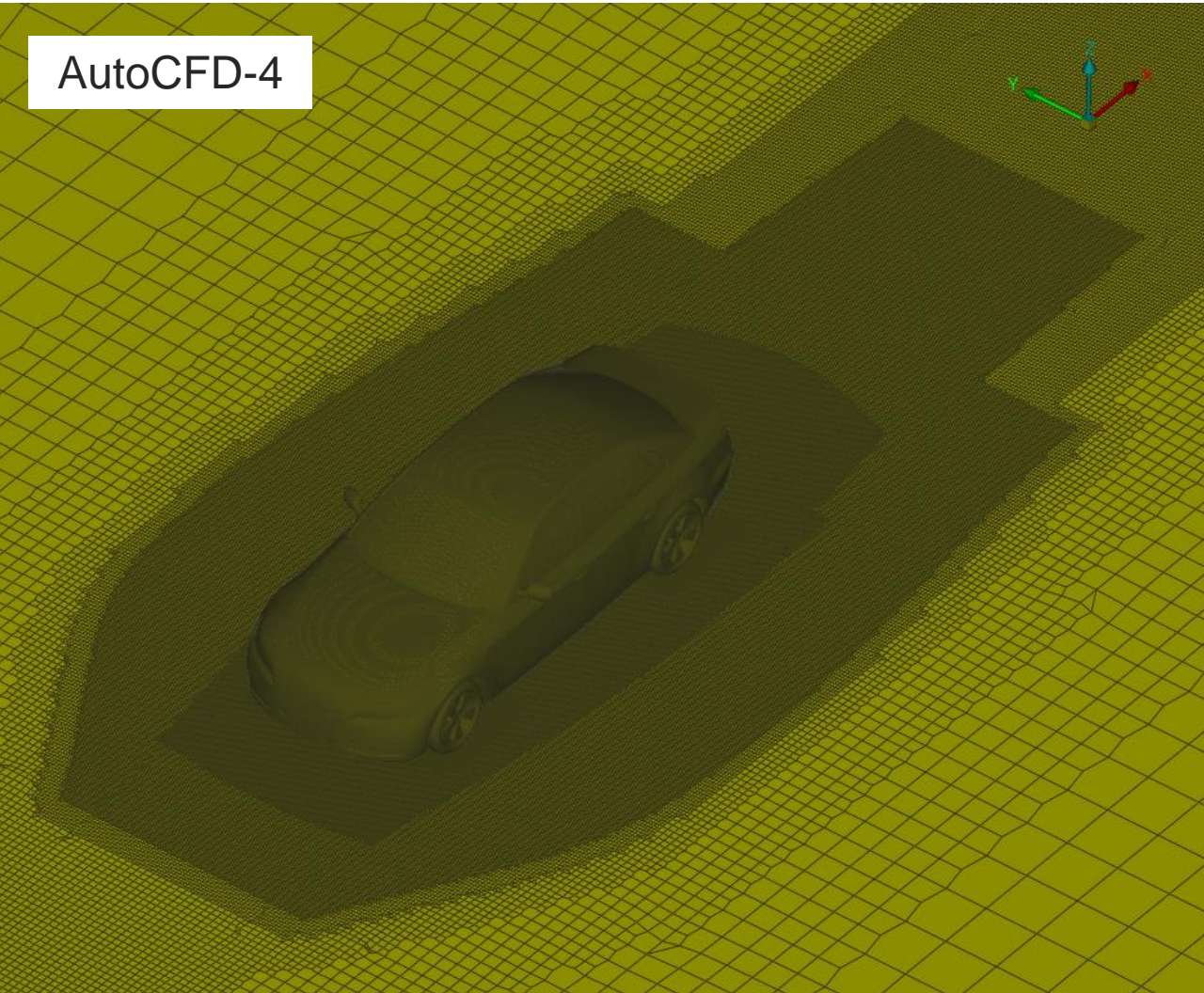


# Surface mesh size contour plot (mm)

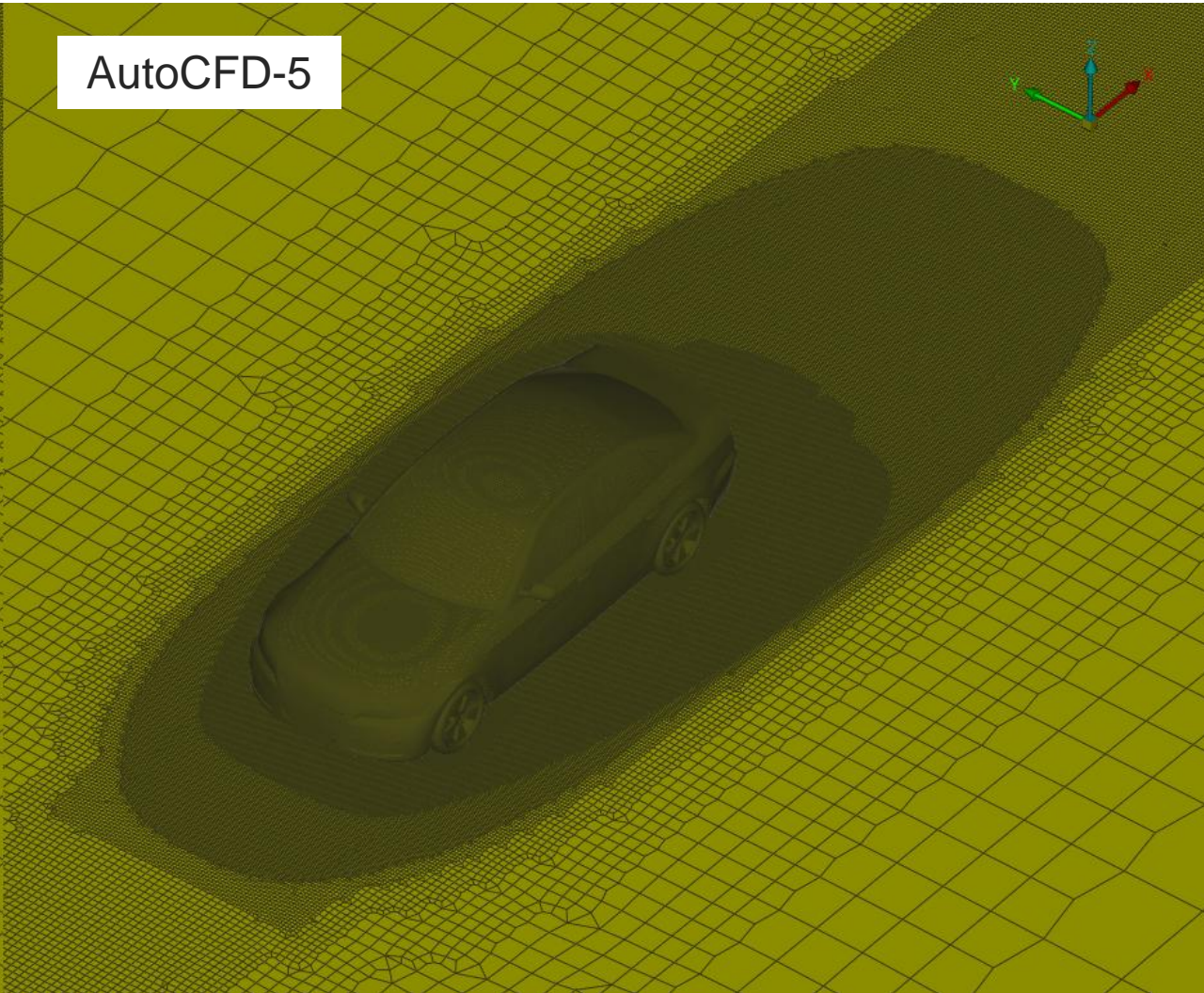


# Surface mesh

AutoCFD-4

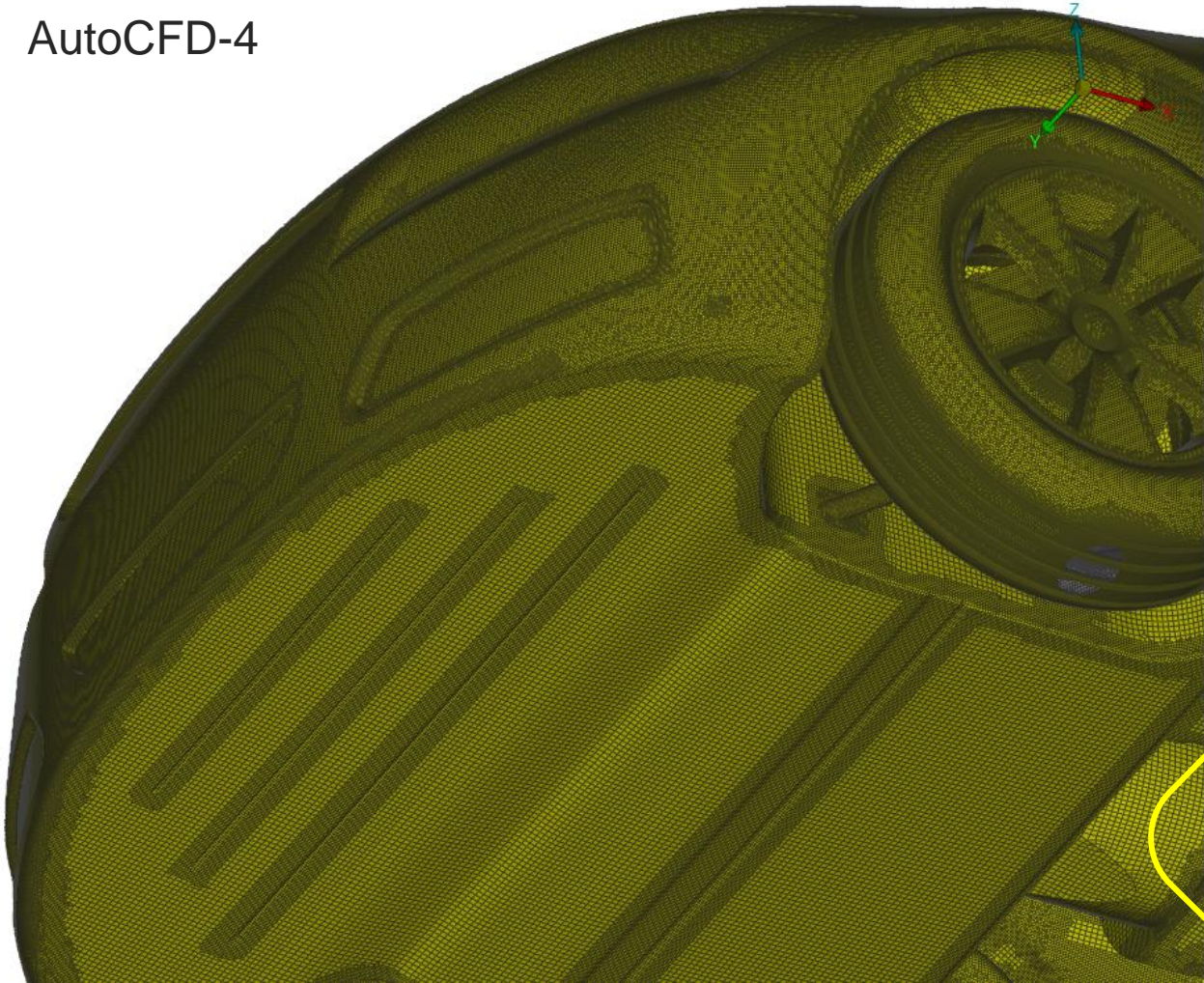


AutoCFD-5

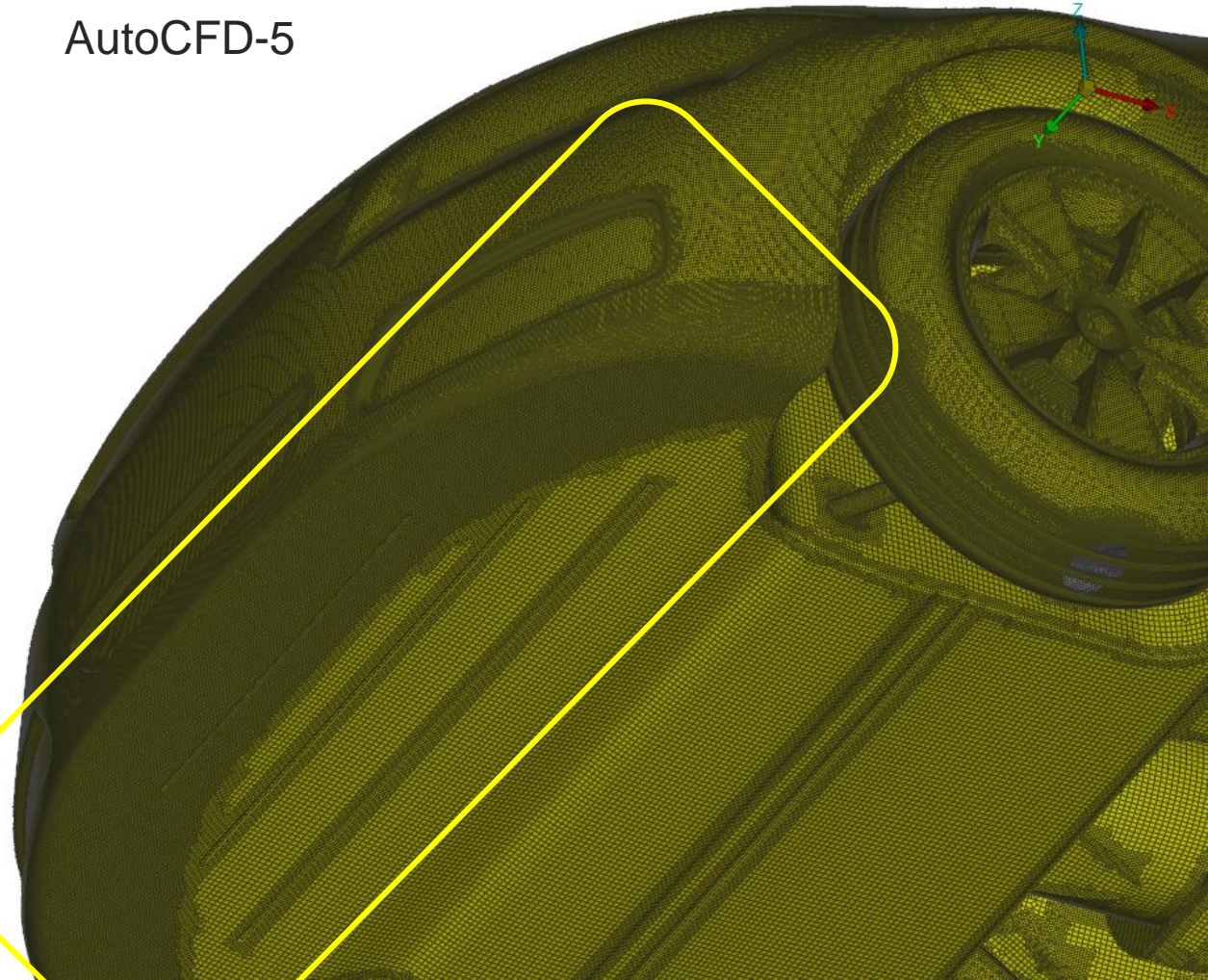


# Surface mesh – refined area at front fascia lower lip

AutoCFD-4

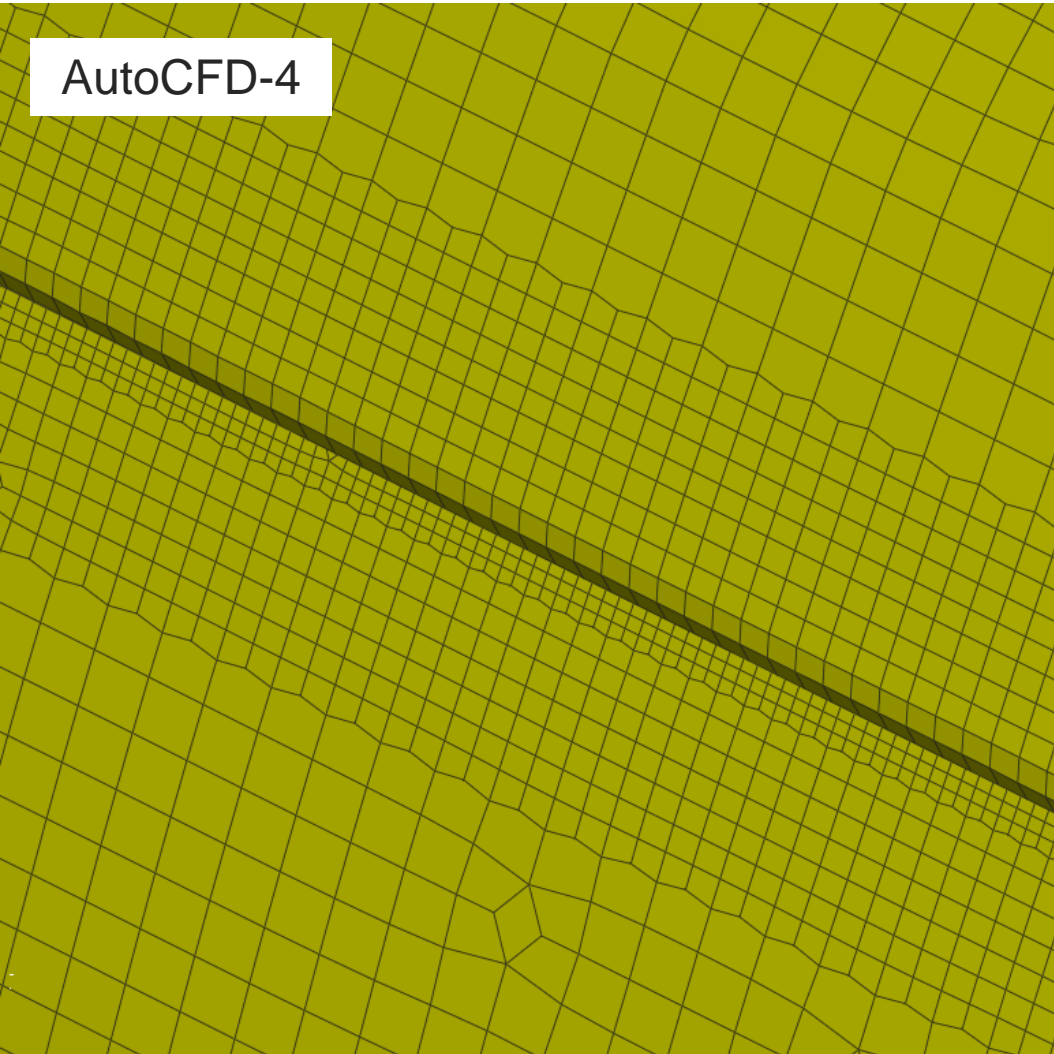


AutoCFD-5

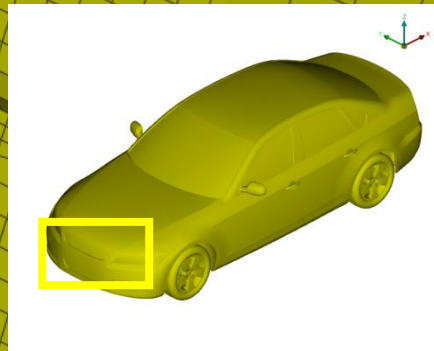
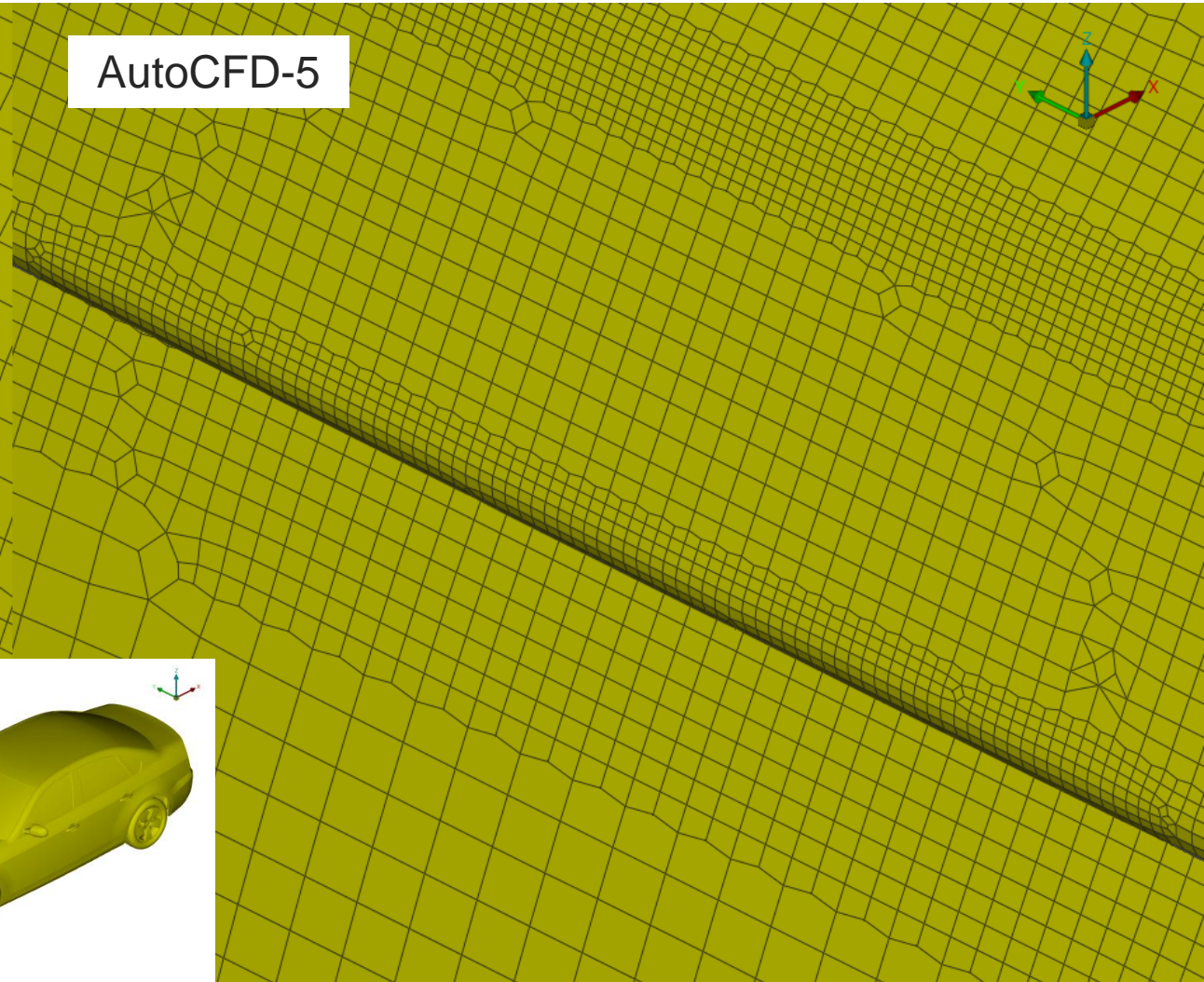


# Surface mesh size near front grill lip

AutoCFD-4



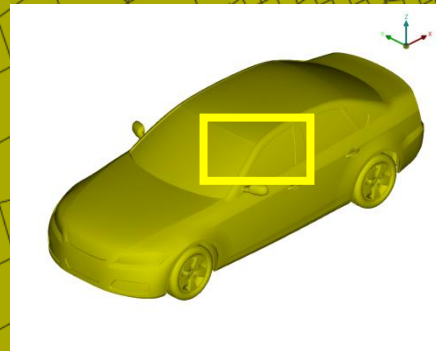
AutoCFD-5



# Surface mesh near A-pillar region

AutoCFD-4

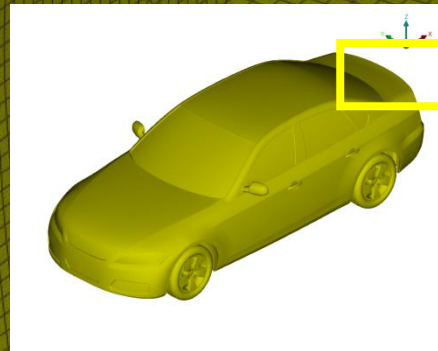
AutoCFD-5



# Surface mesh near rear boot lip

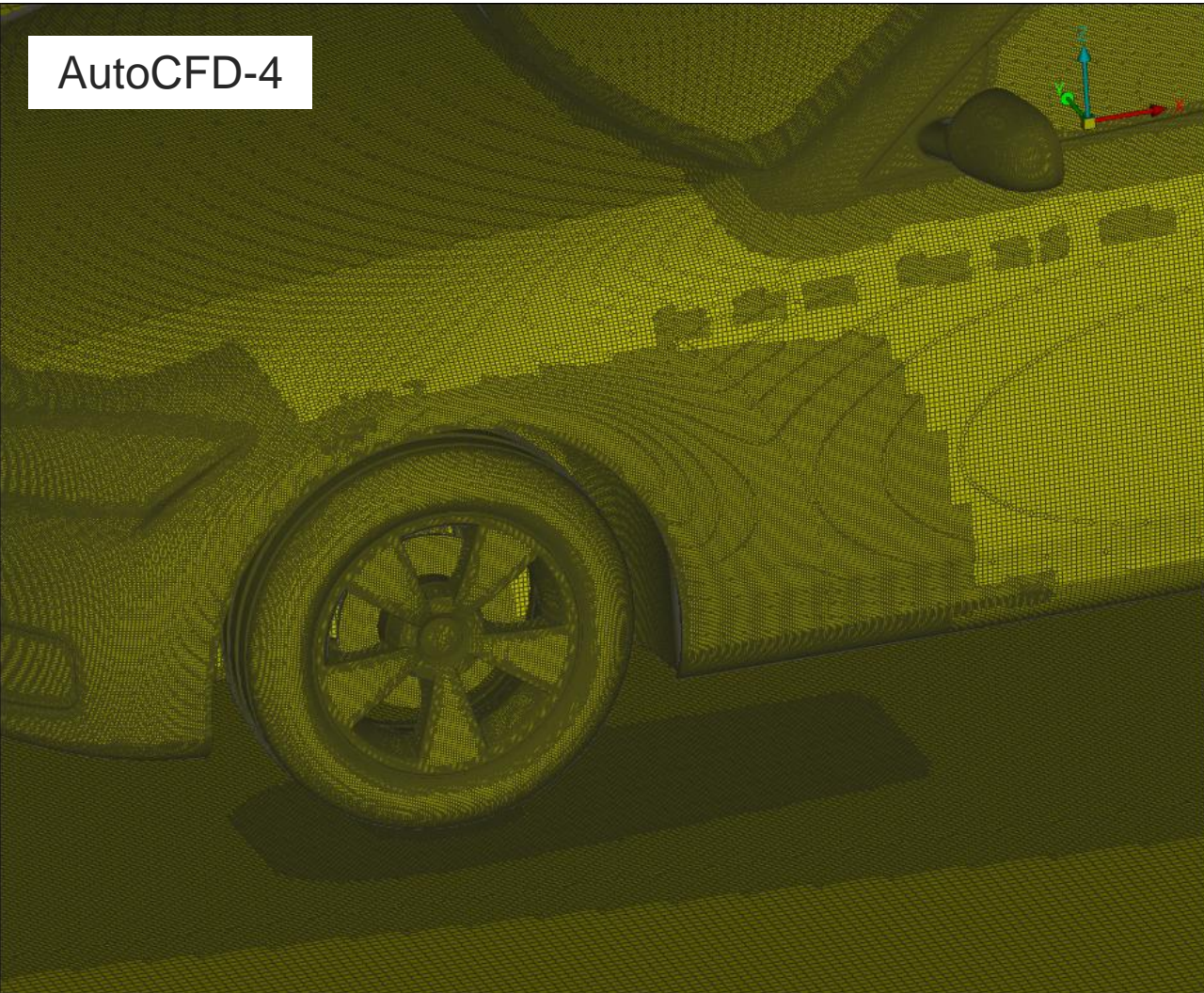
AutoCFD-4

AutoCFD-5

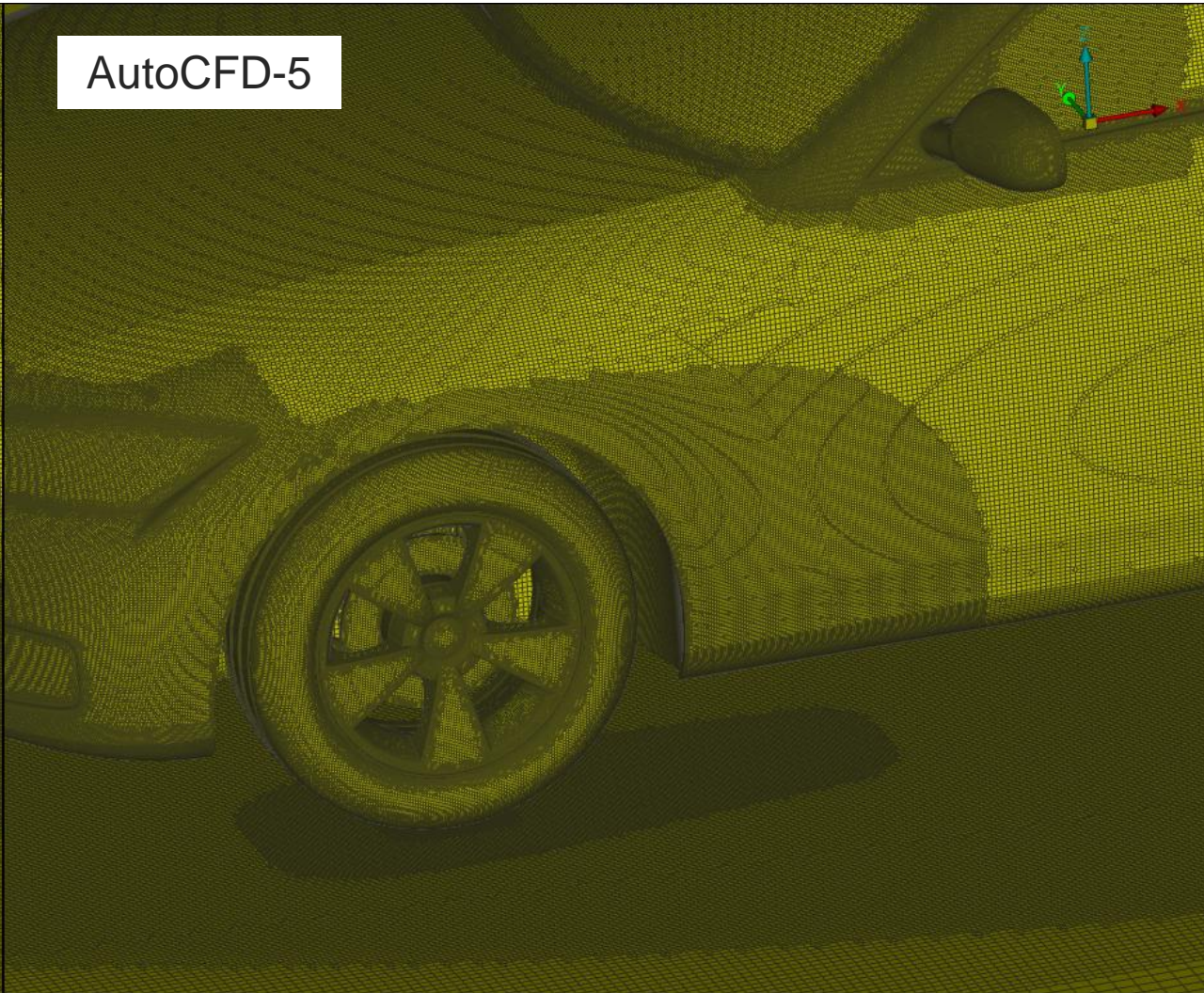


# Surface mesh – small reduction of mirror wake refinement

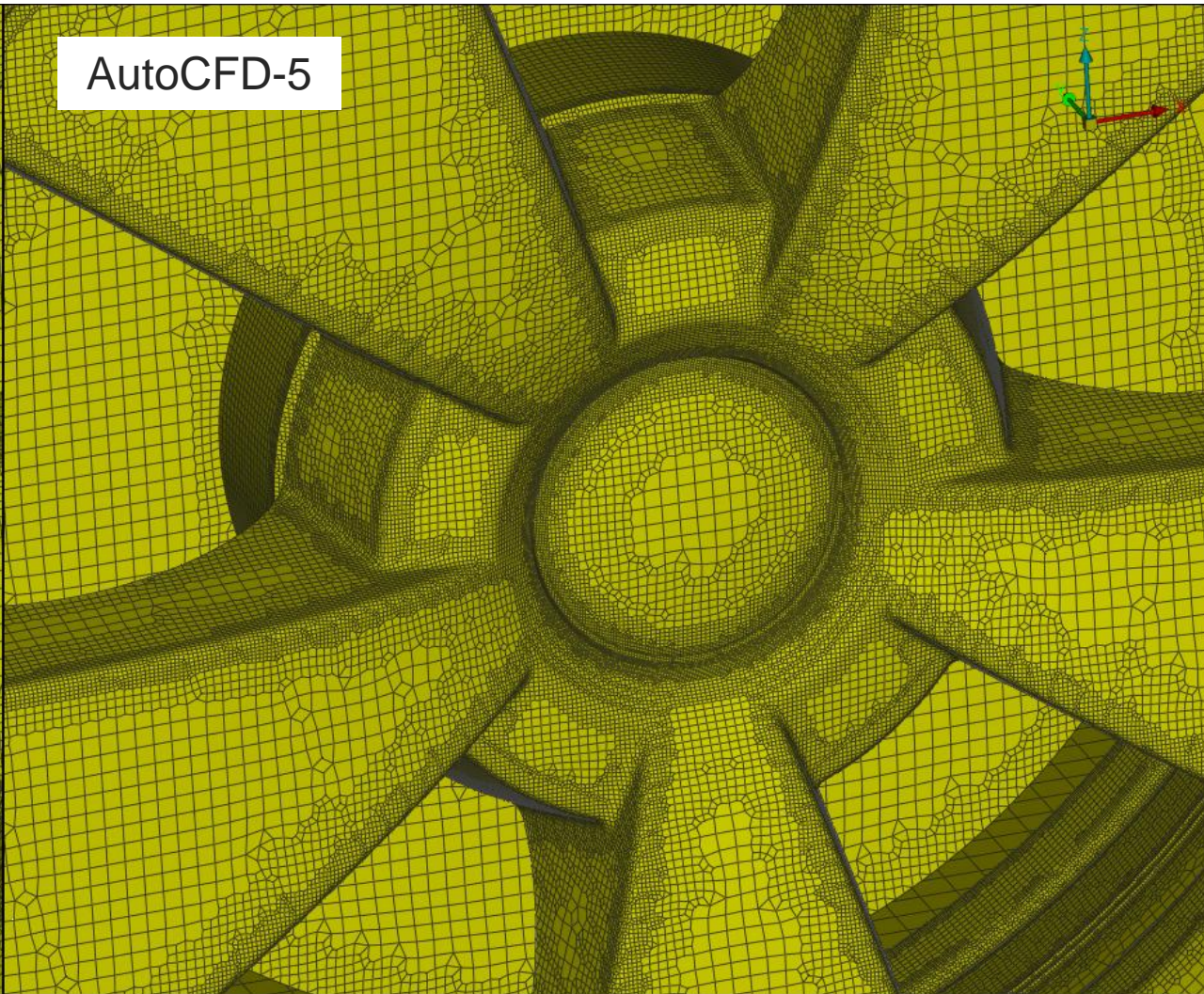
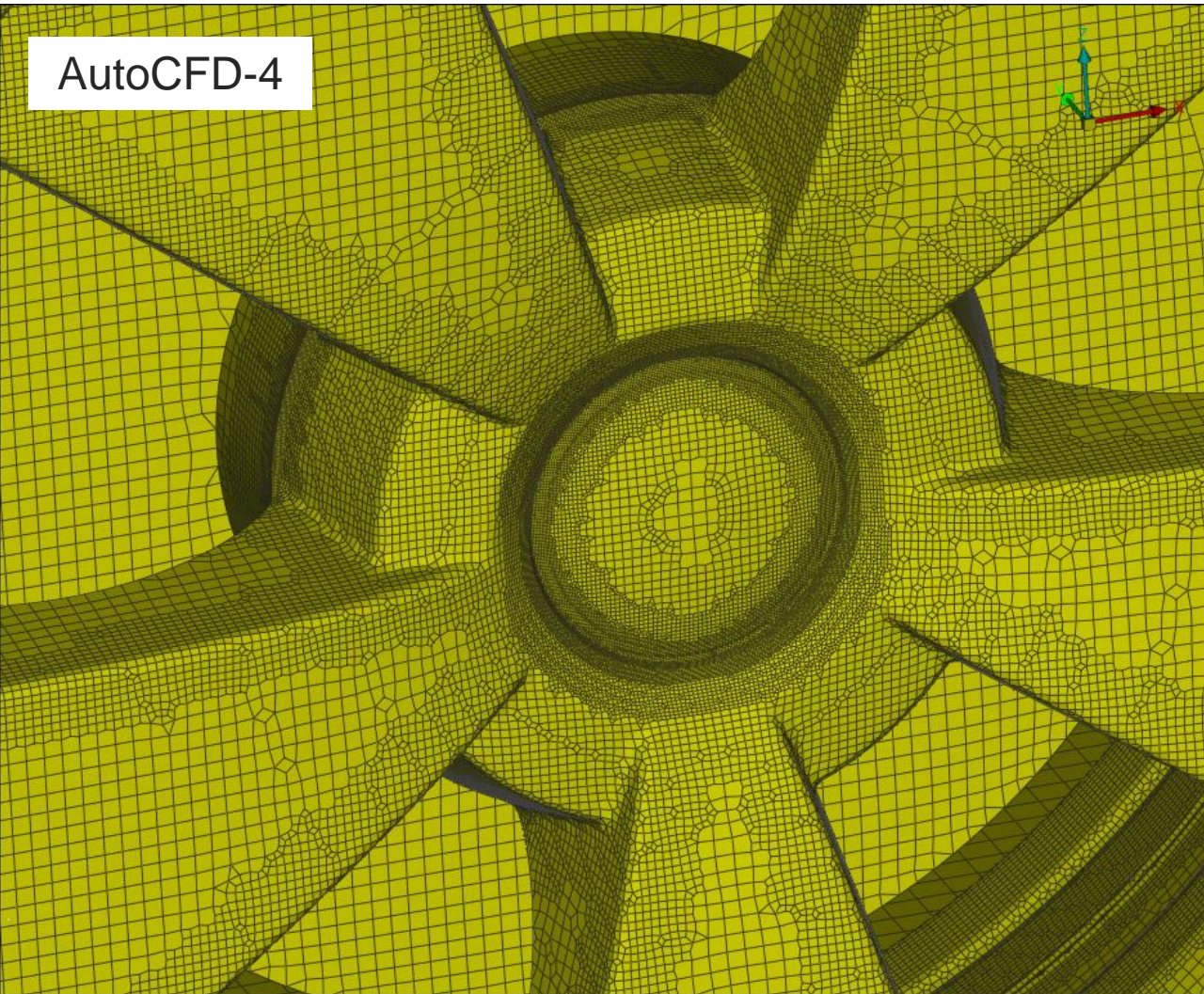
AutoCFD-4



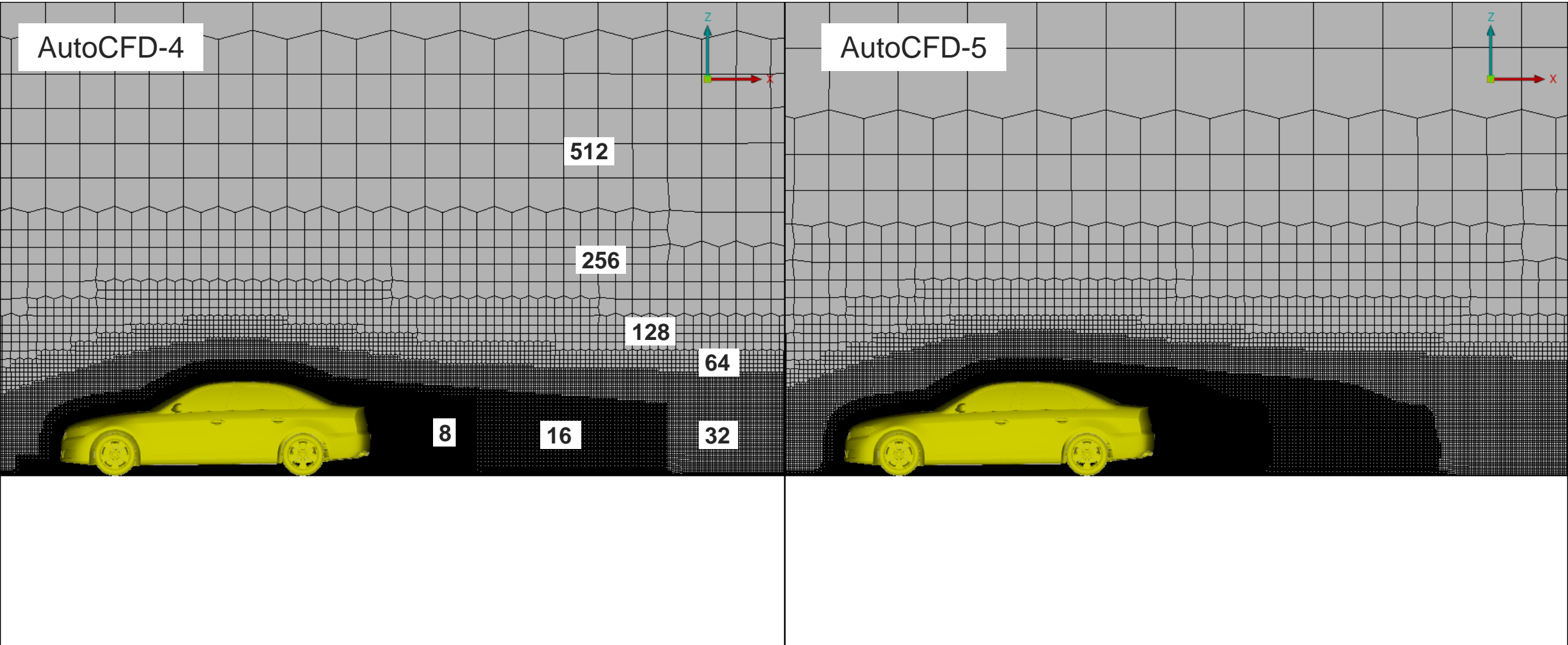
AutoCFD-5



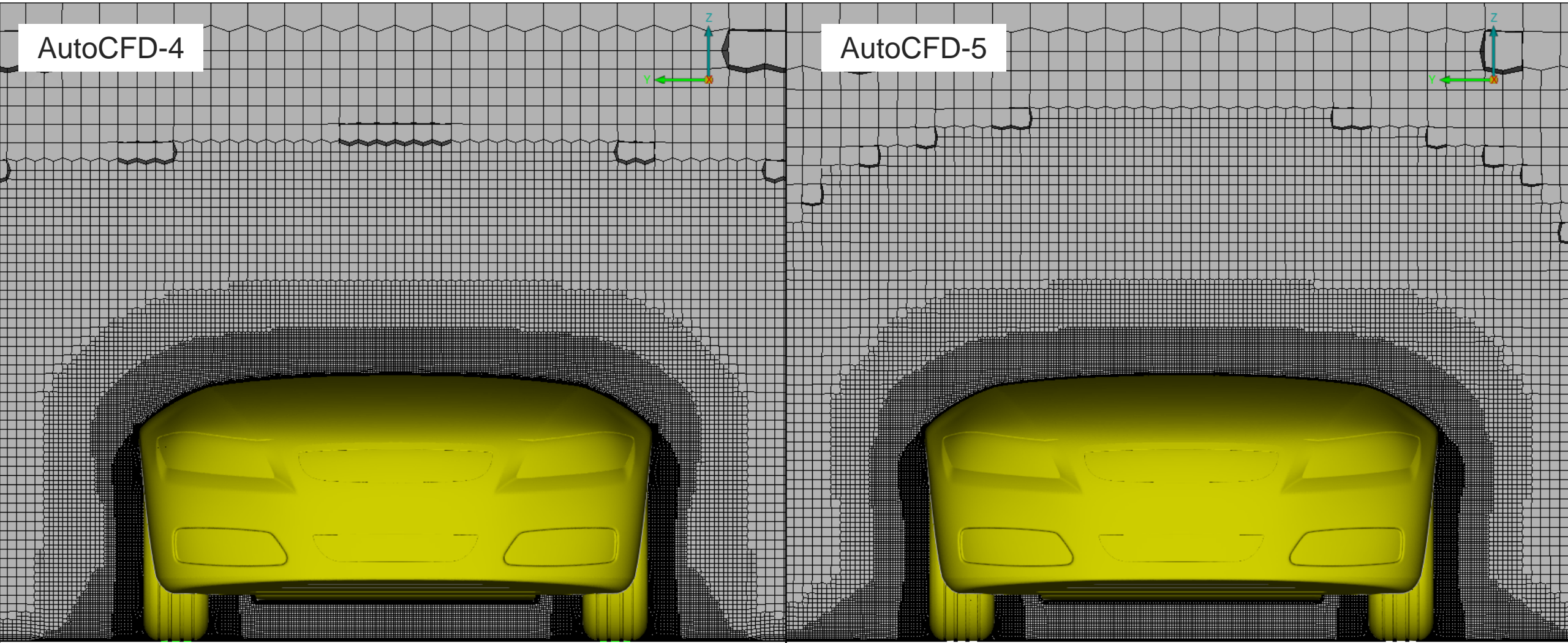
# Surface mesh – small reduction of mirror wake refinement



# Volume mesh

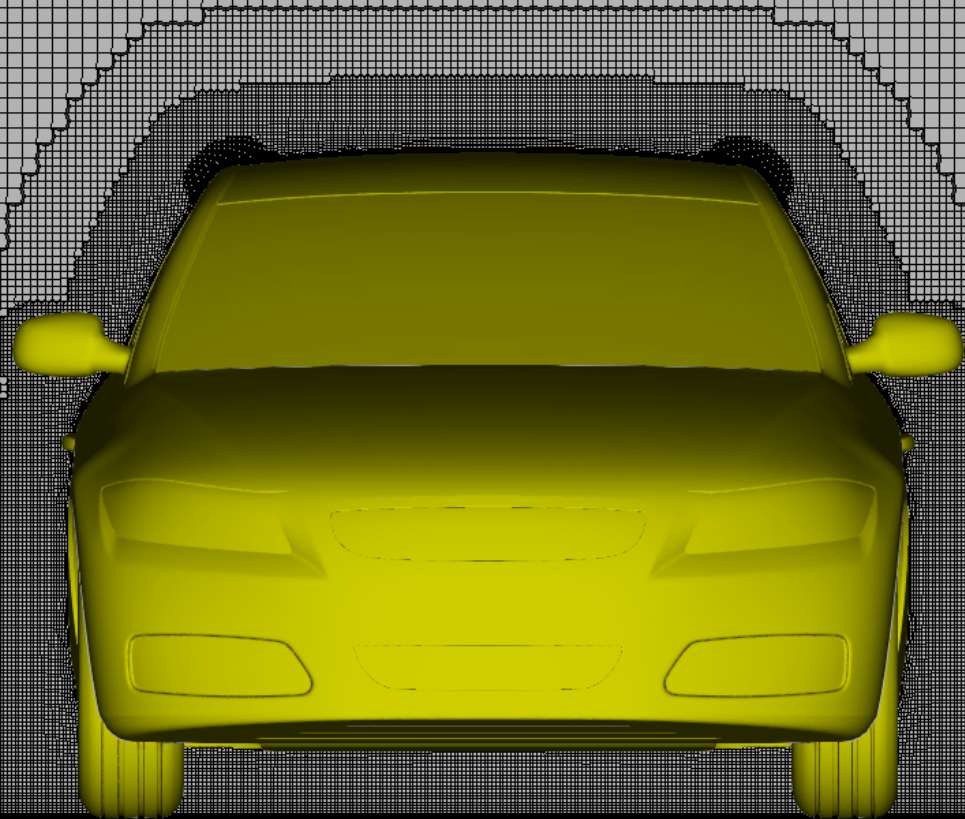


# Volume mesh at front wheel axis

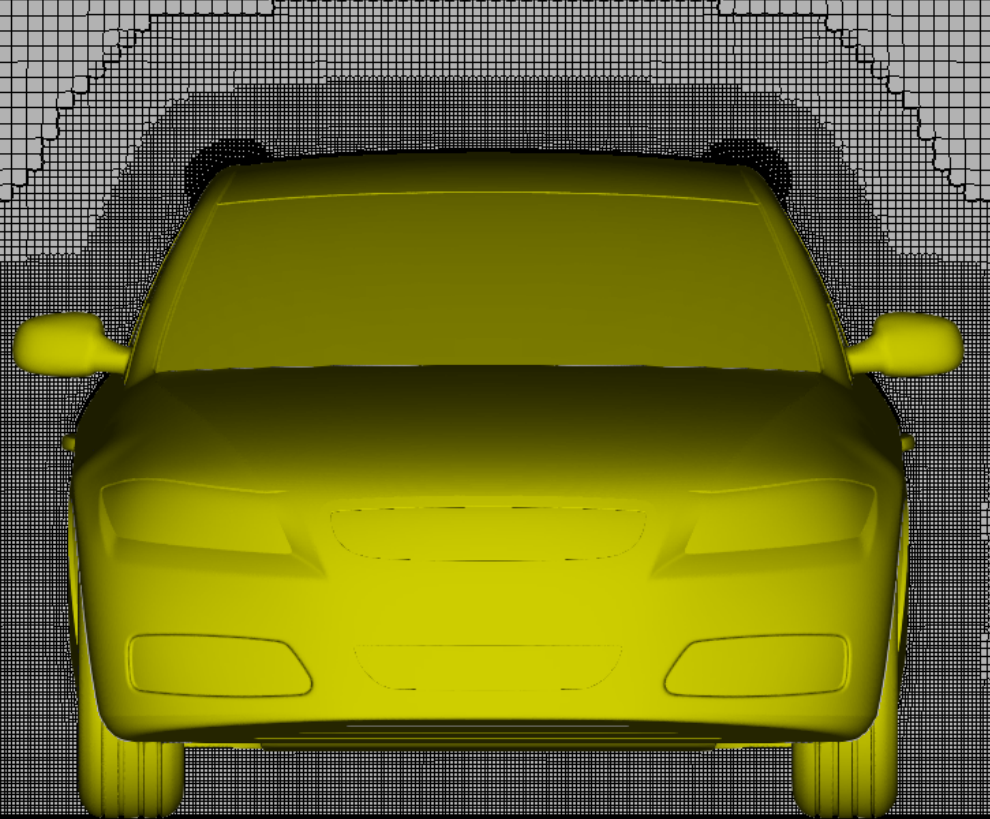


# Volume mesh at B-pillar

AutoCFD-4

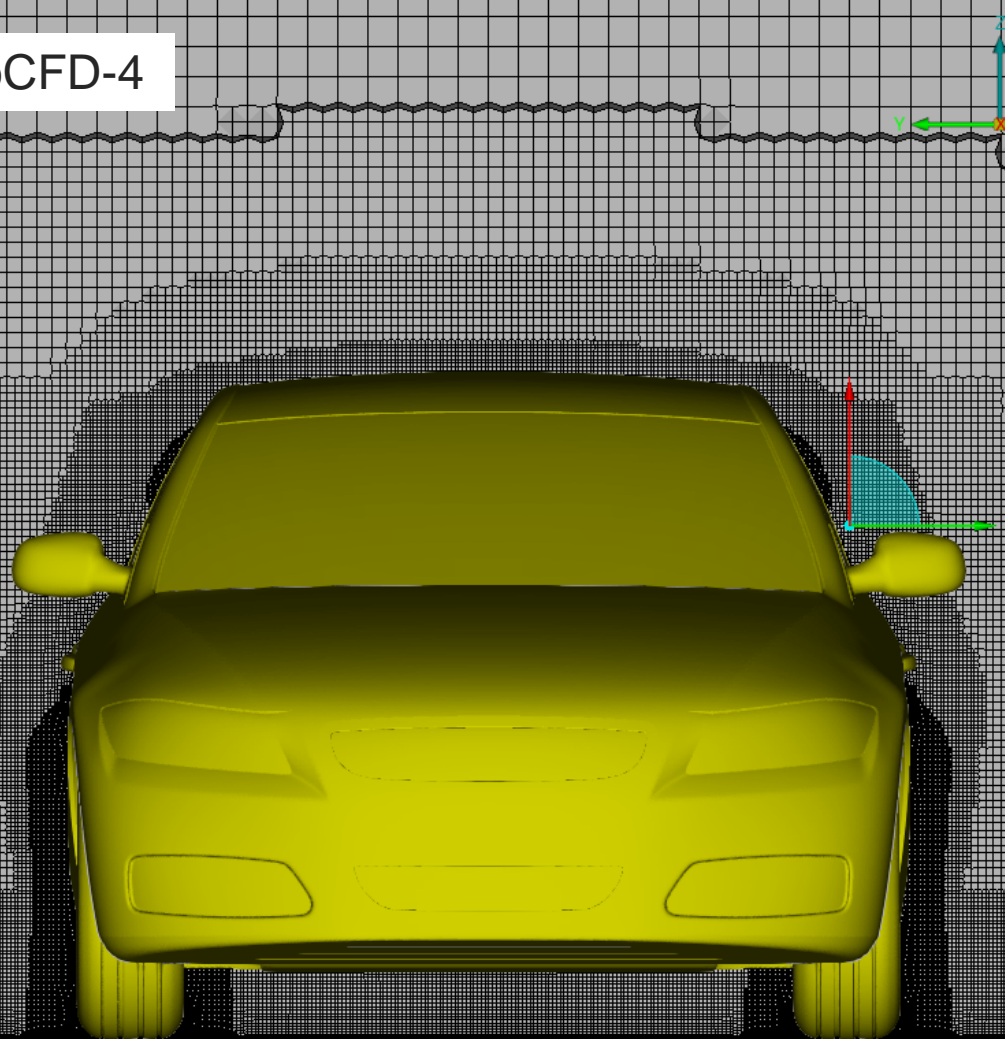


AutoCFD-5

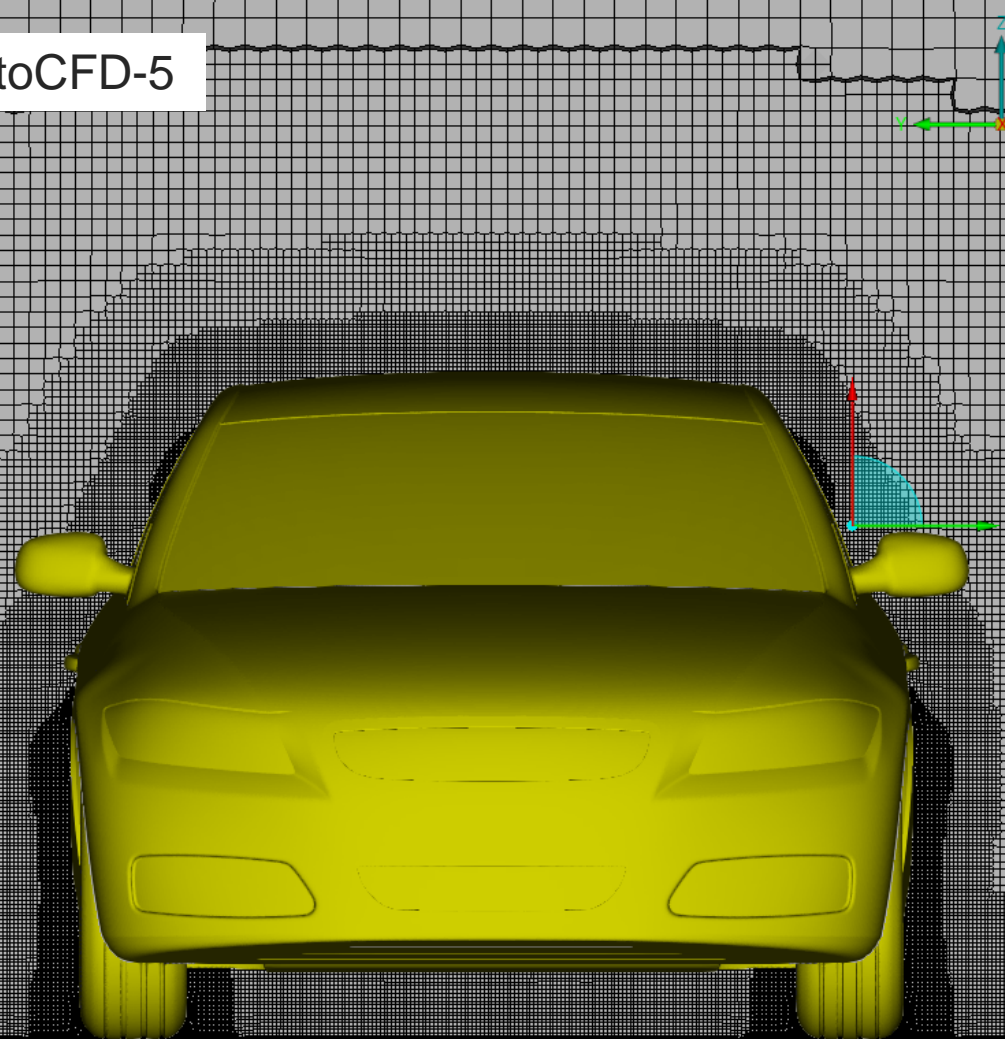


# Volume mesh at rear wheel axis

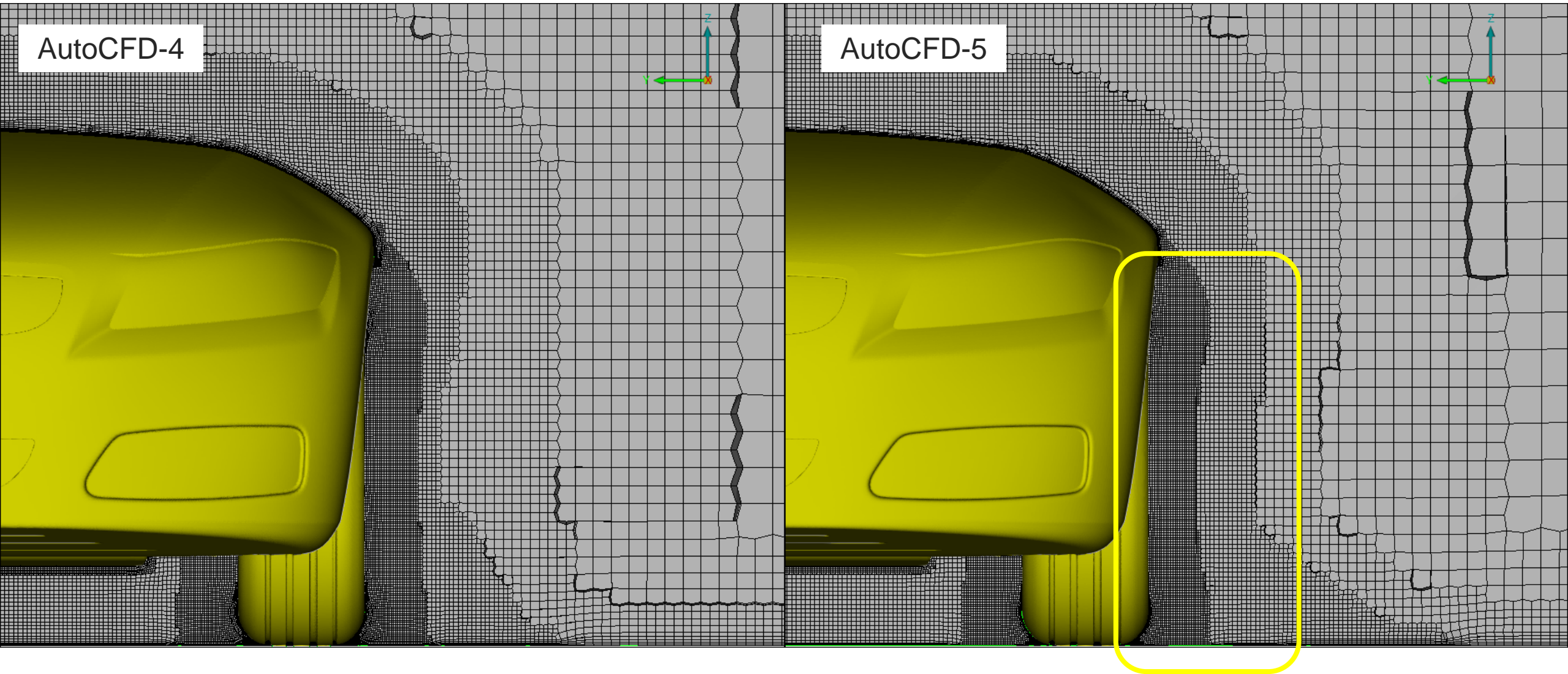
AutoCFD-4



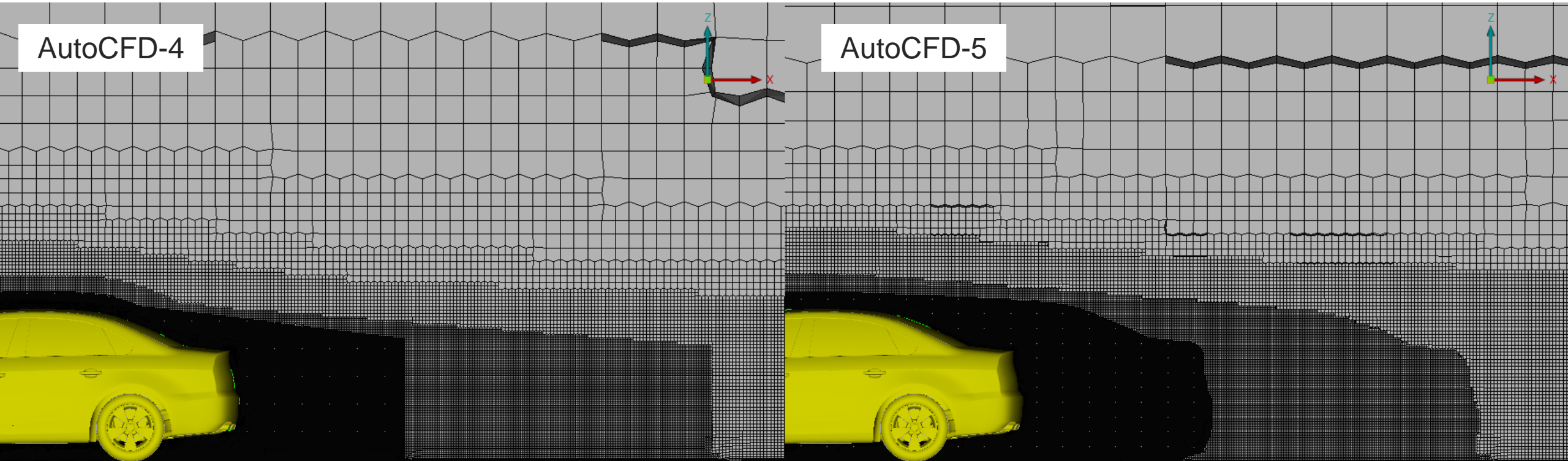
AutoCFD-5



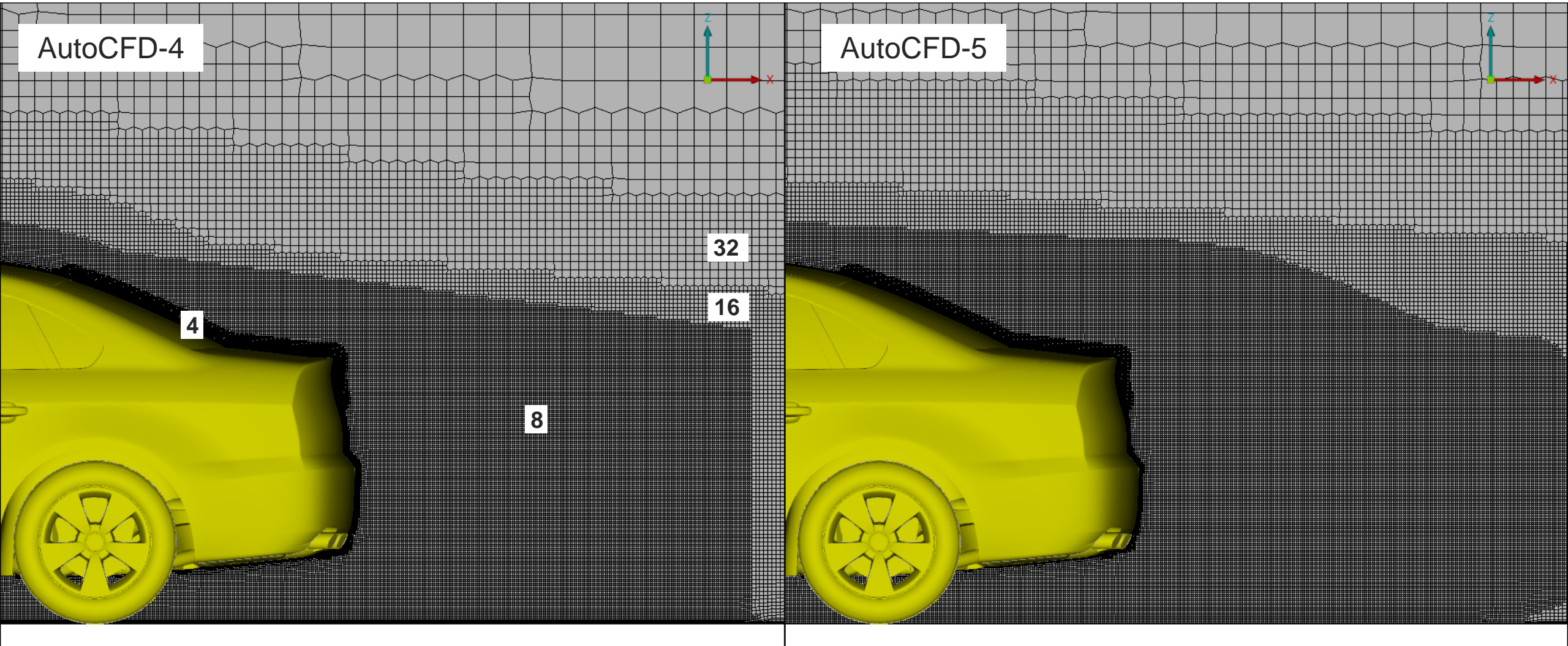
# Volume mesh at front wheel axis



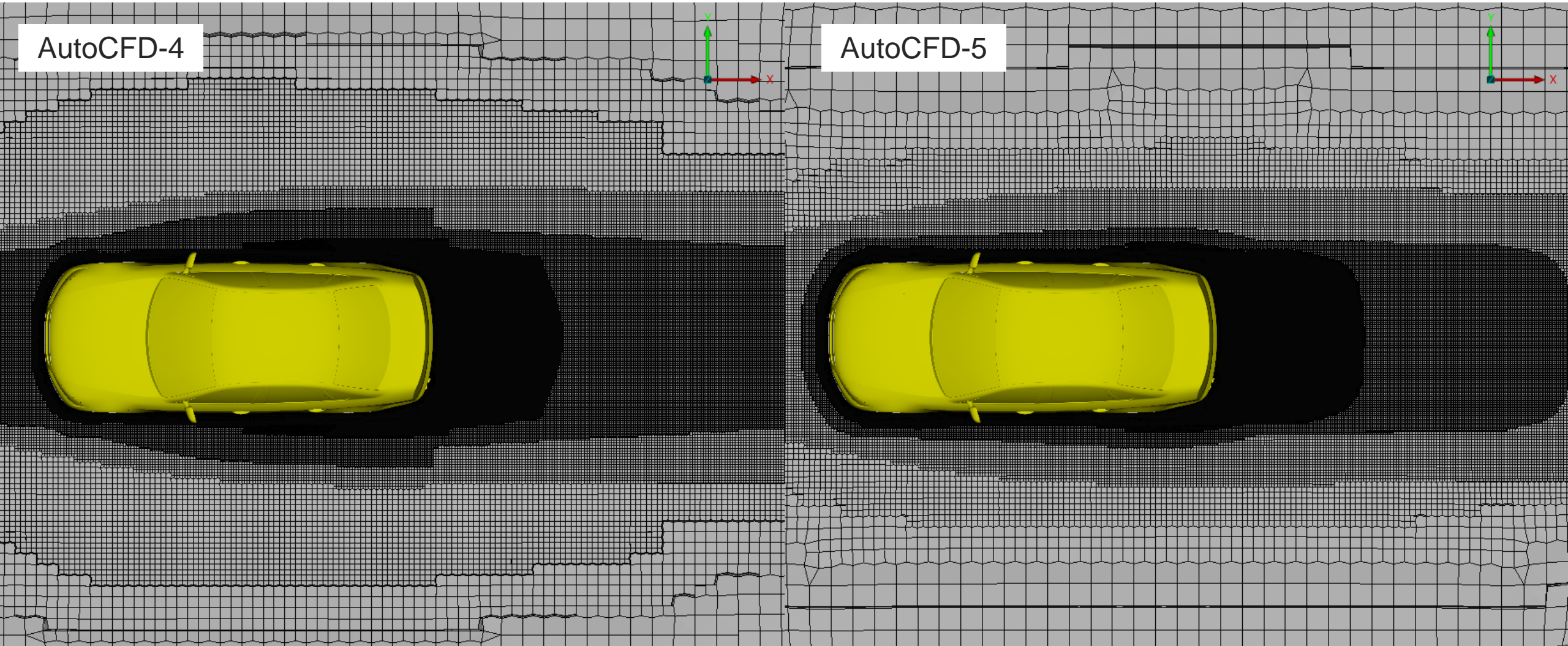
# Volume mesh – Size Boxes replaced by Surface Offset size rules



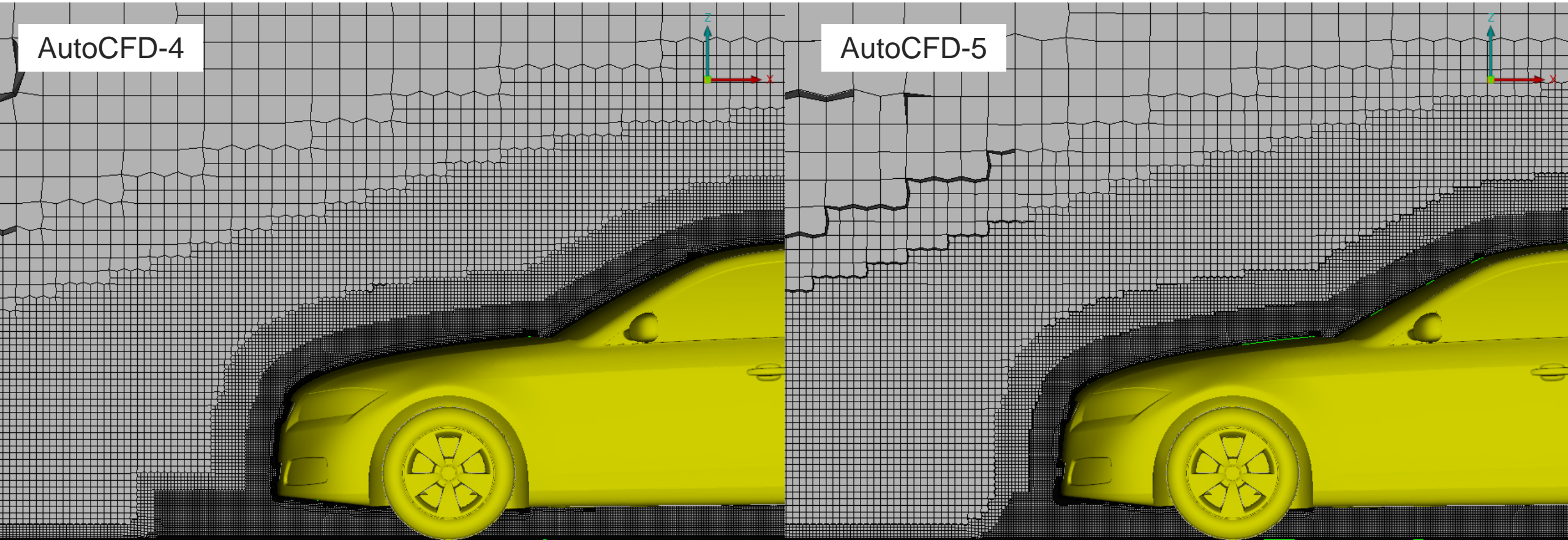
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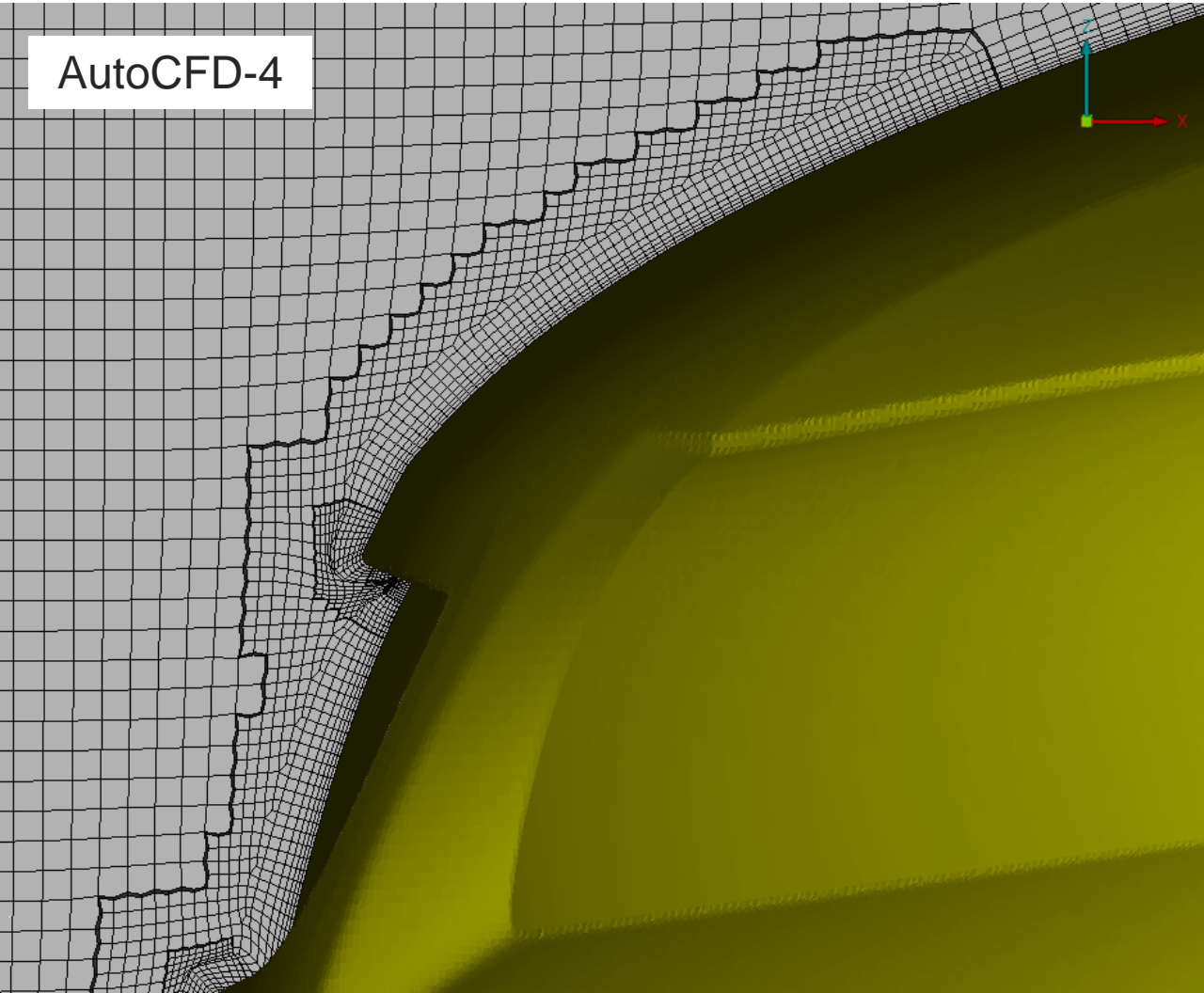


# Volume mesh – small reduction of upstream lower refinement area

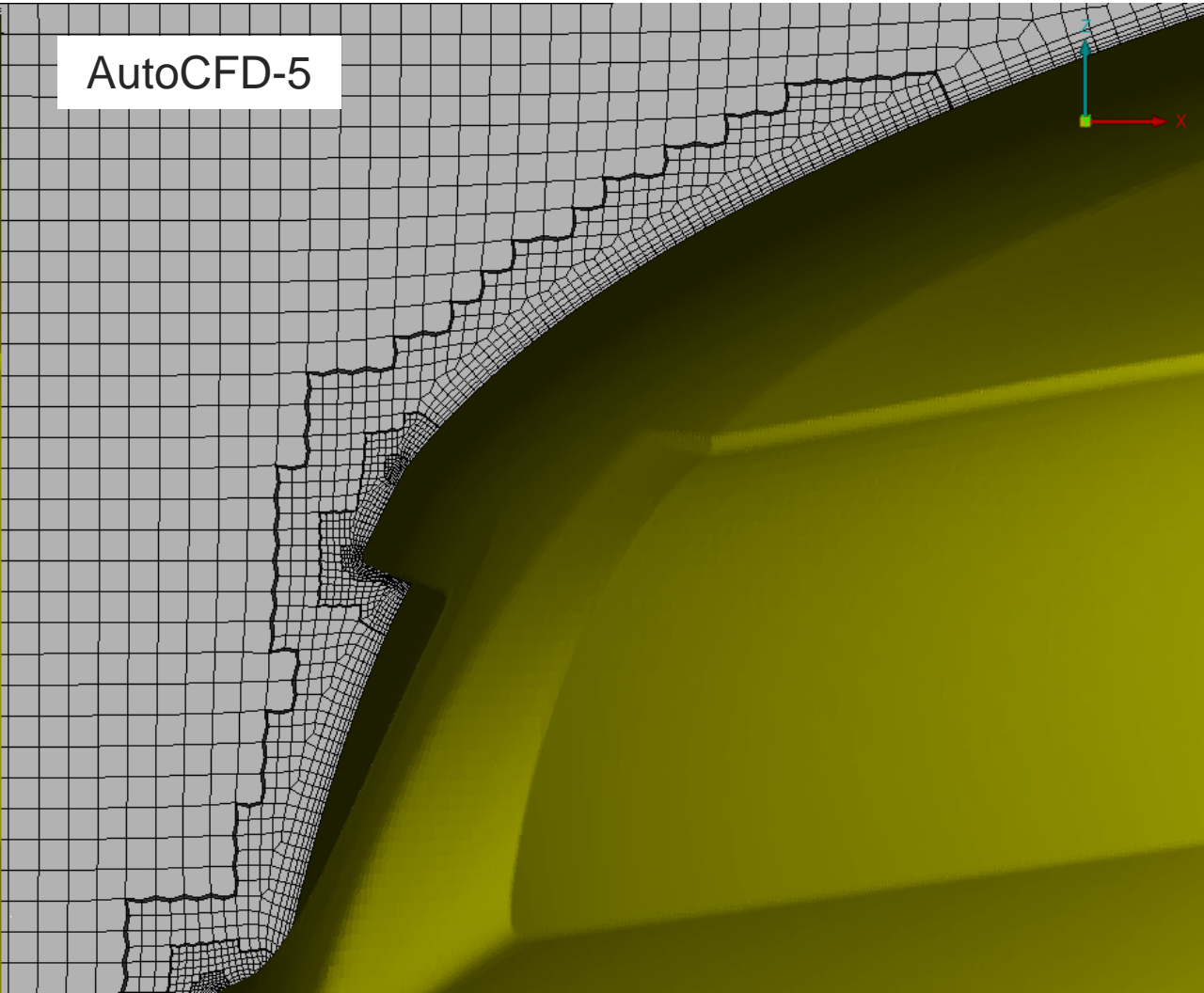


# Volume mesh – reduction of N layers from 7 to 5

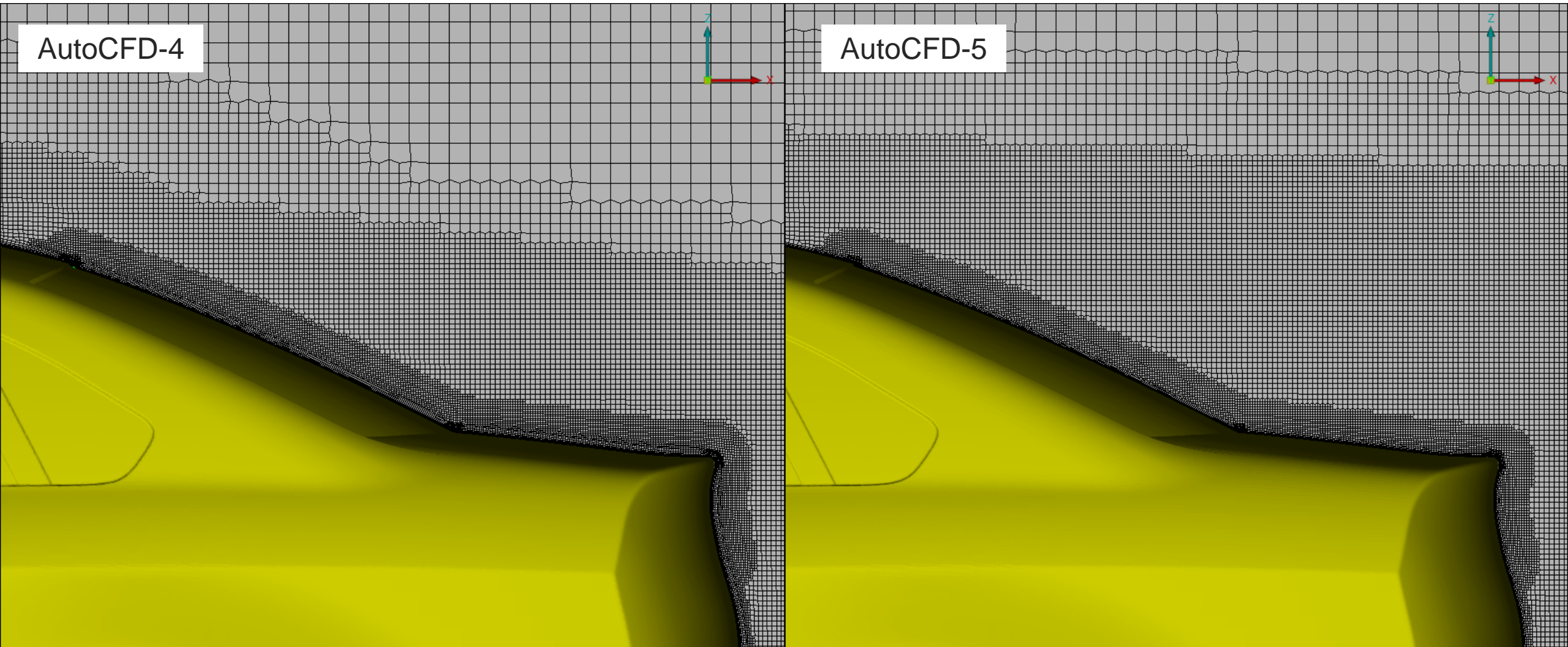
AutoCFD-4



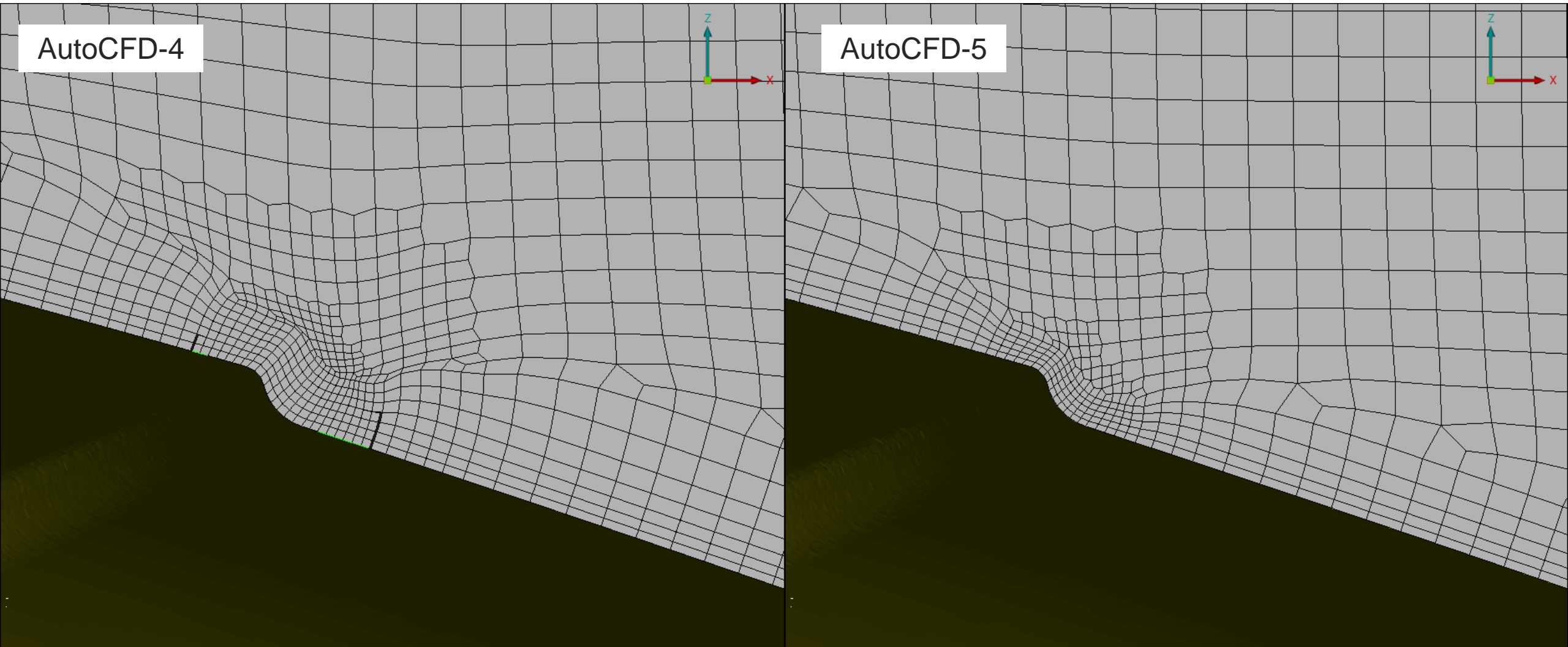
AutoCFD-5



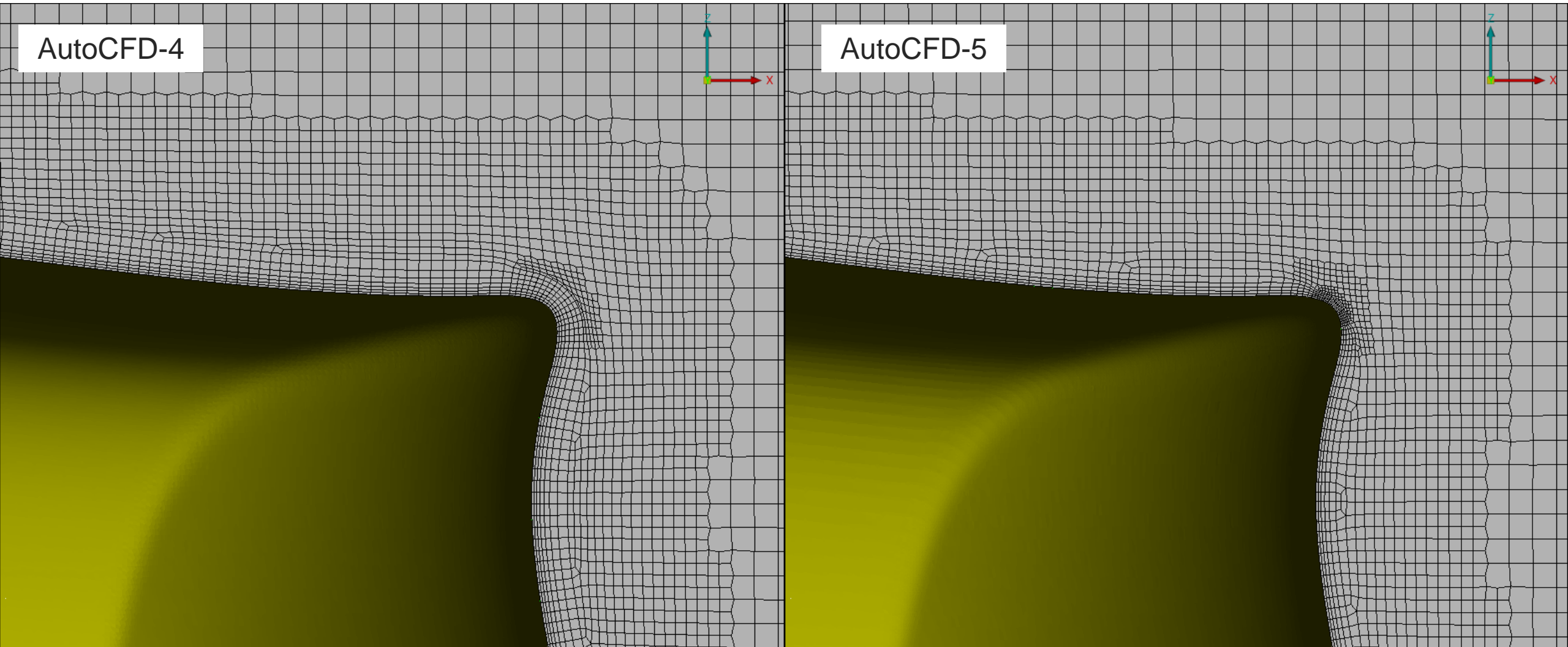
# Volume mesh – reduction of N layers from 7 to 5



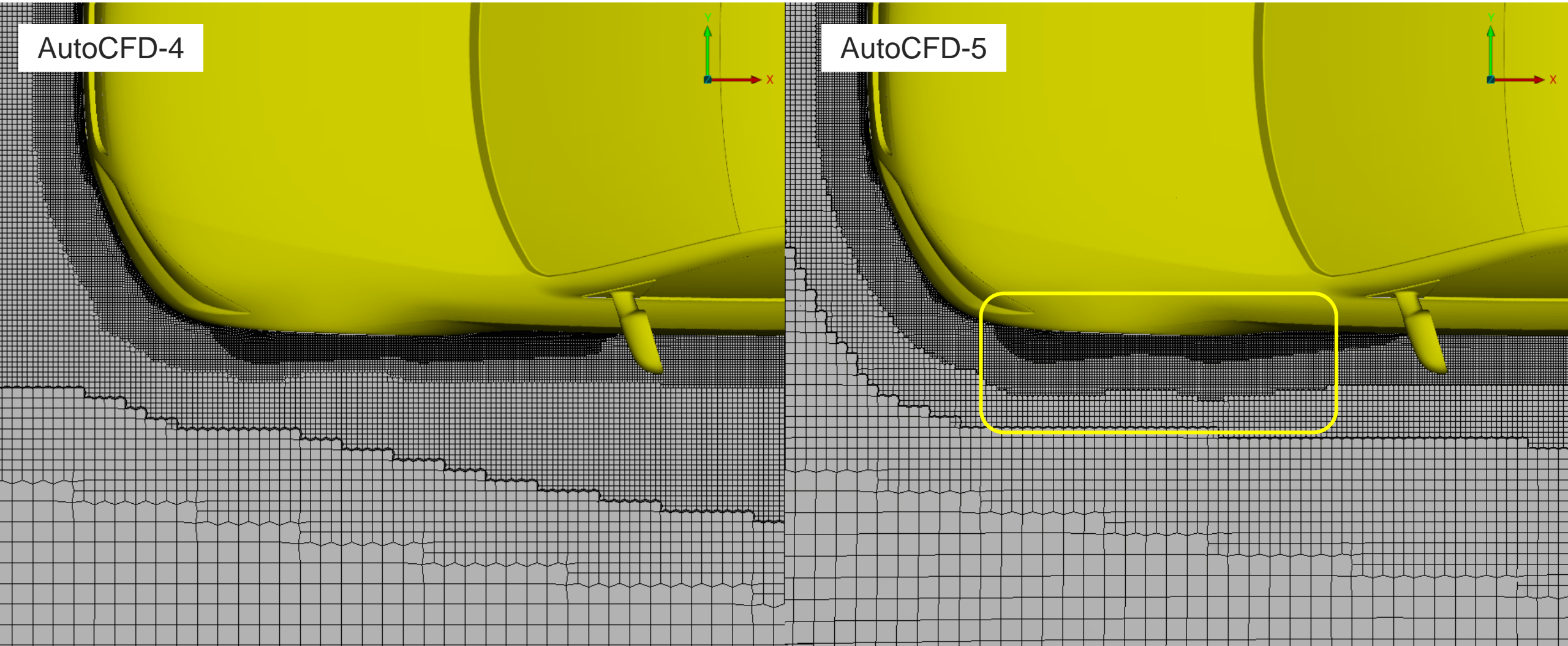
# Volume mesh – reduction of N layers from 7 to 5



# Volume mesh – removal of offset refinement and finer curvature

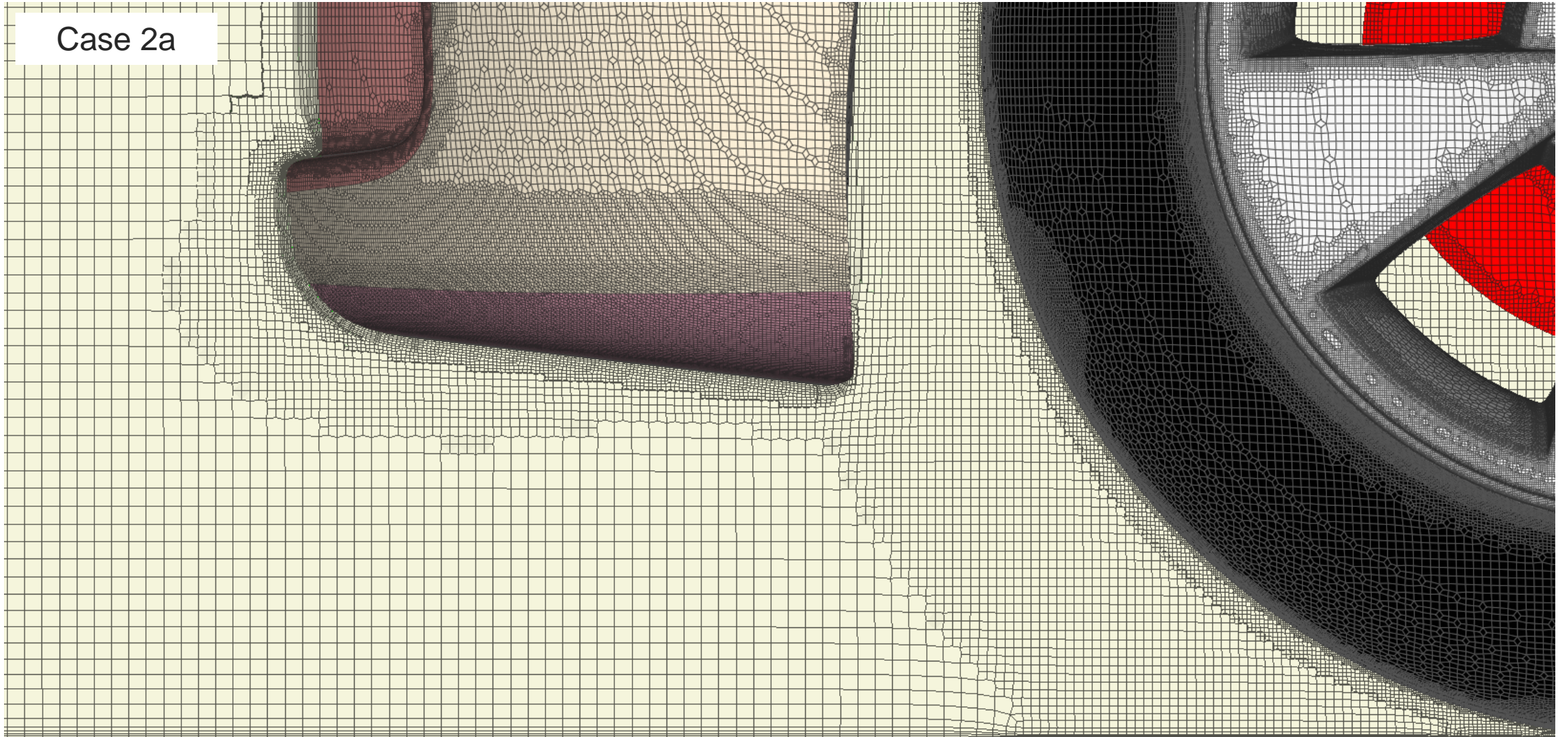


# Volume mesh – widening of refinement near front wheel



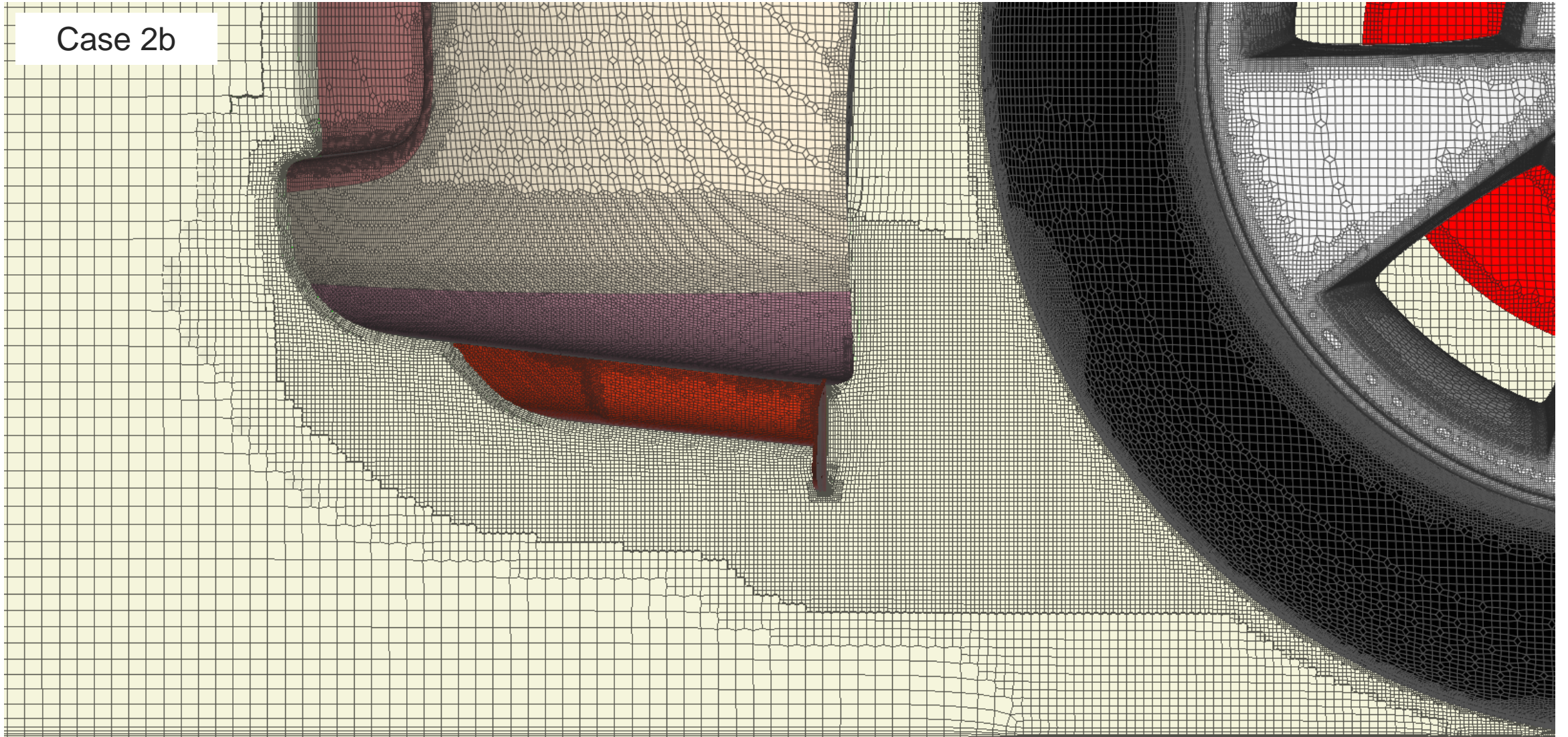
# Volume mesh – consistency between variants

Case 2a



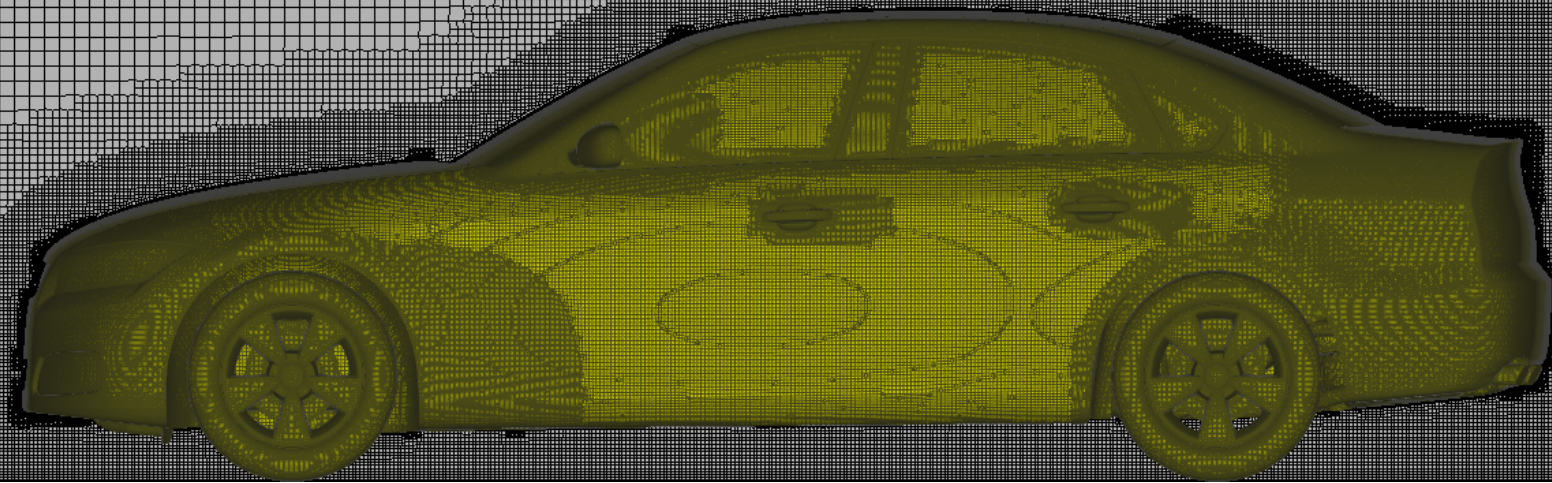
# Volume mesh – consistency between variants

Case 2b



# Mesh Refinement study – Coarse

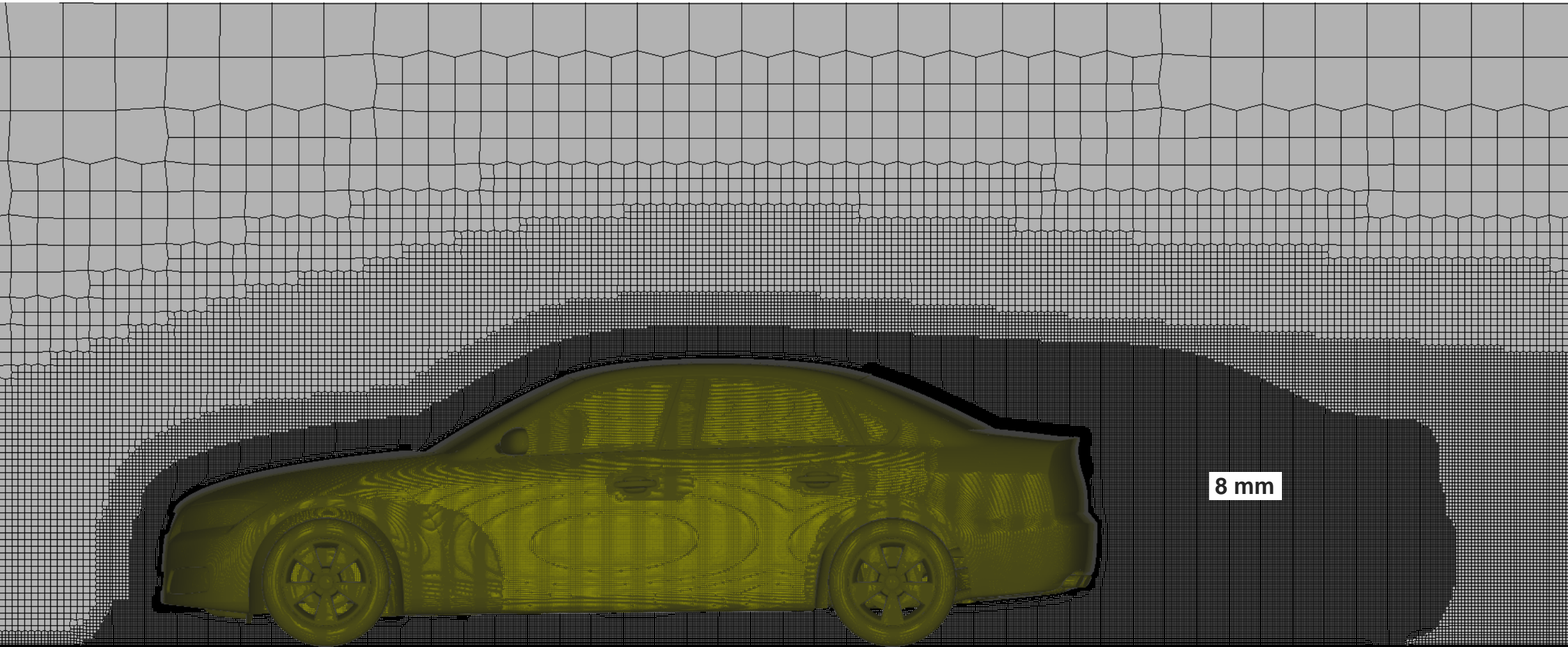
Global length scale factor of  $\sqrt{2}$  from medium mesh



11.3mm

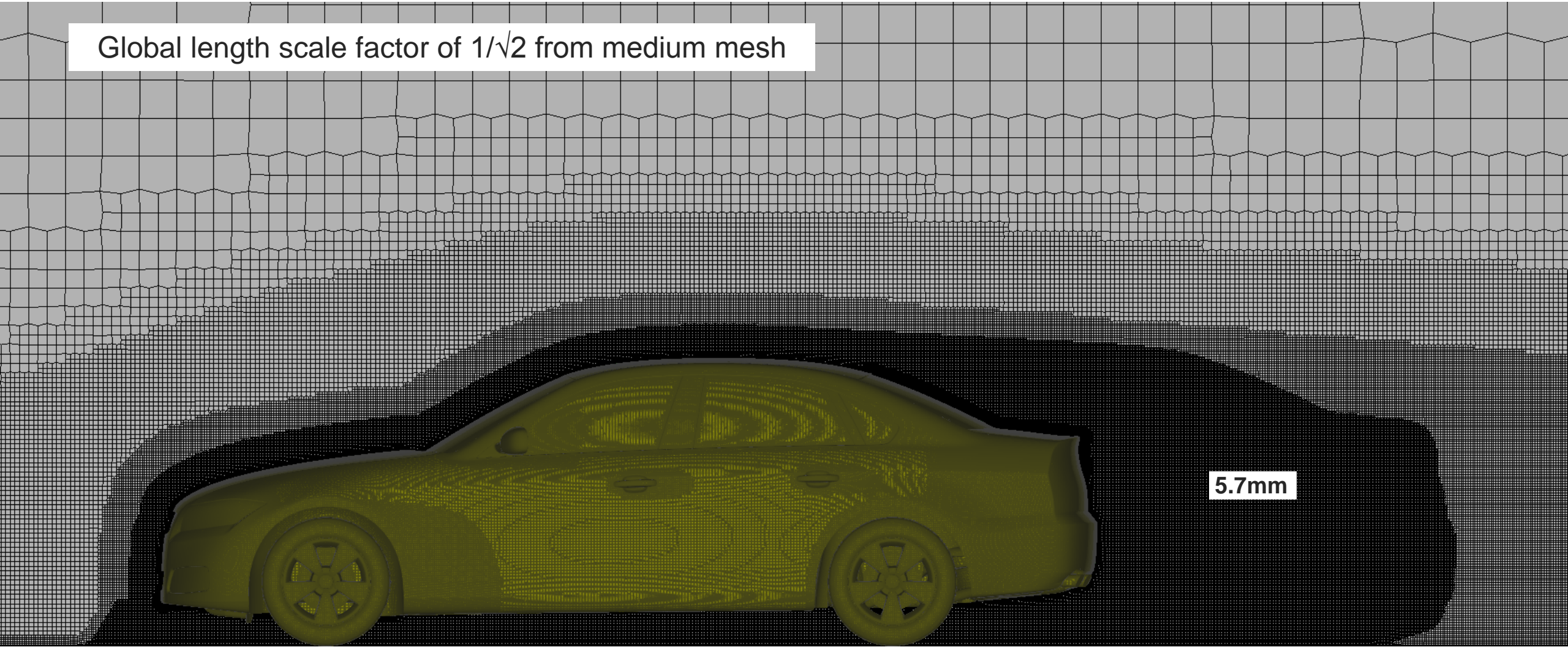
Layers specifications remain the same as for Medium size mesh

# Mesh Refinement study – Medium



# Mesh Refinement study – Fine

Global length scale factor of  $1/\sqrt{2}$  from medium mesh



Layers specifications remain the same as for Medium size mesh

# Summary of new meshes available for download for AutoCFD-5

All files are in meters

- Volume meshes at three mesh refinement levels and in **OpenFOAM**, **Fluent** and **CGNS** formats with the following cell count (in millions):

	Coarse	Medium	Fine
Case 2a – Notchback baseline	66	123	260
Case 2b – Notchback with deflectors	67	126	267

Note: Check the PID names if you are using previous setups, as there have been some renamings.

- Model geometries available in STL format together with 3D descriptions of refinement zones in space. Each iso-surface is named according to the max length it imposes

## Model Geometries

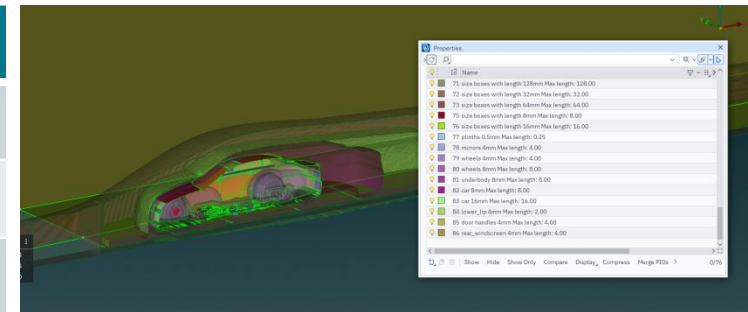
DrivAer Notchback baseline

Additional front wheel deflectors

## Refinement Zones

DrivAer Notchback baseline

Refinement zone of wheel deflectors



# Stay connected

