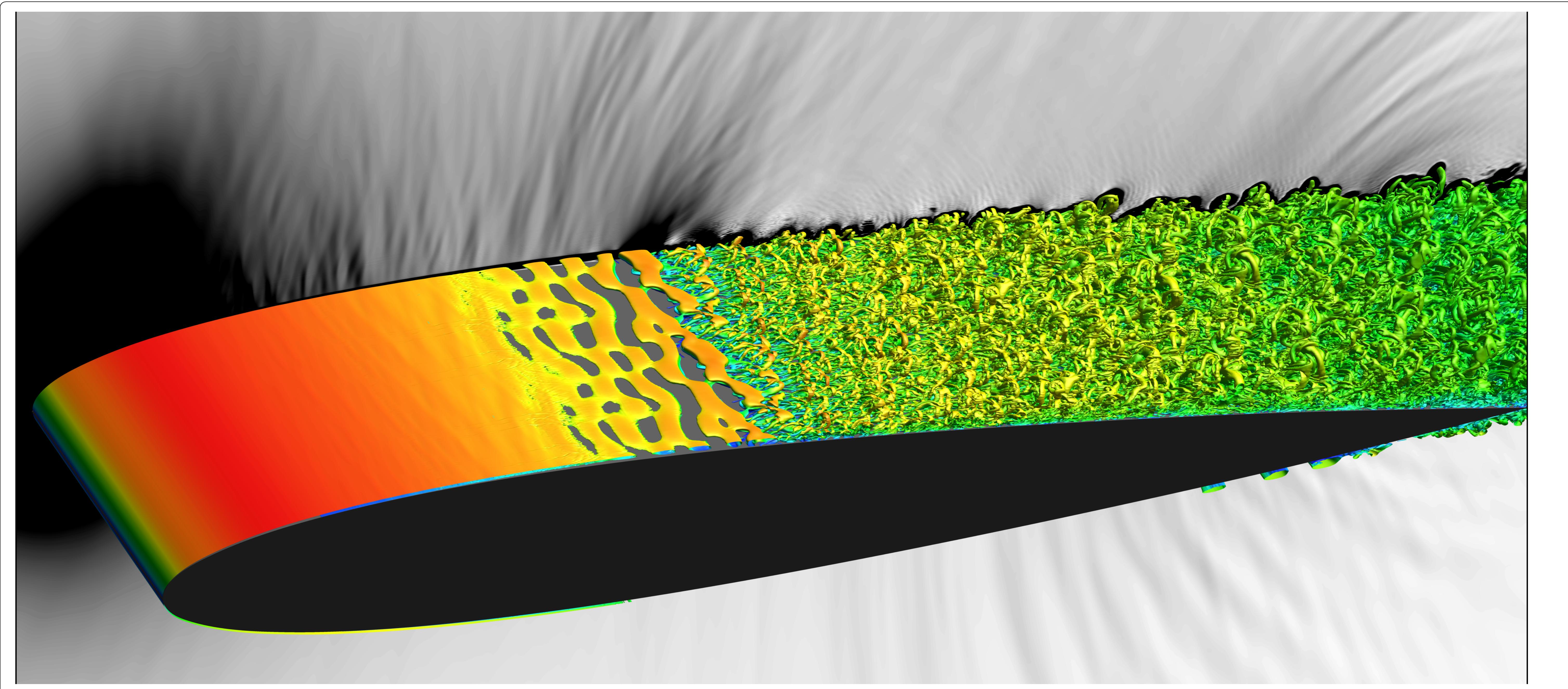
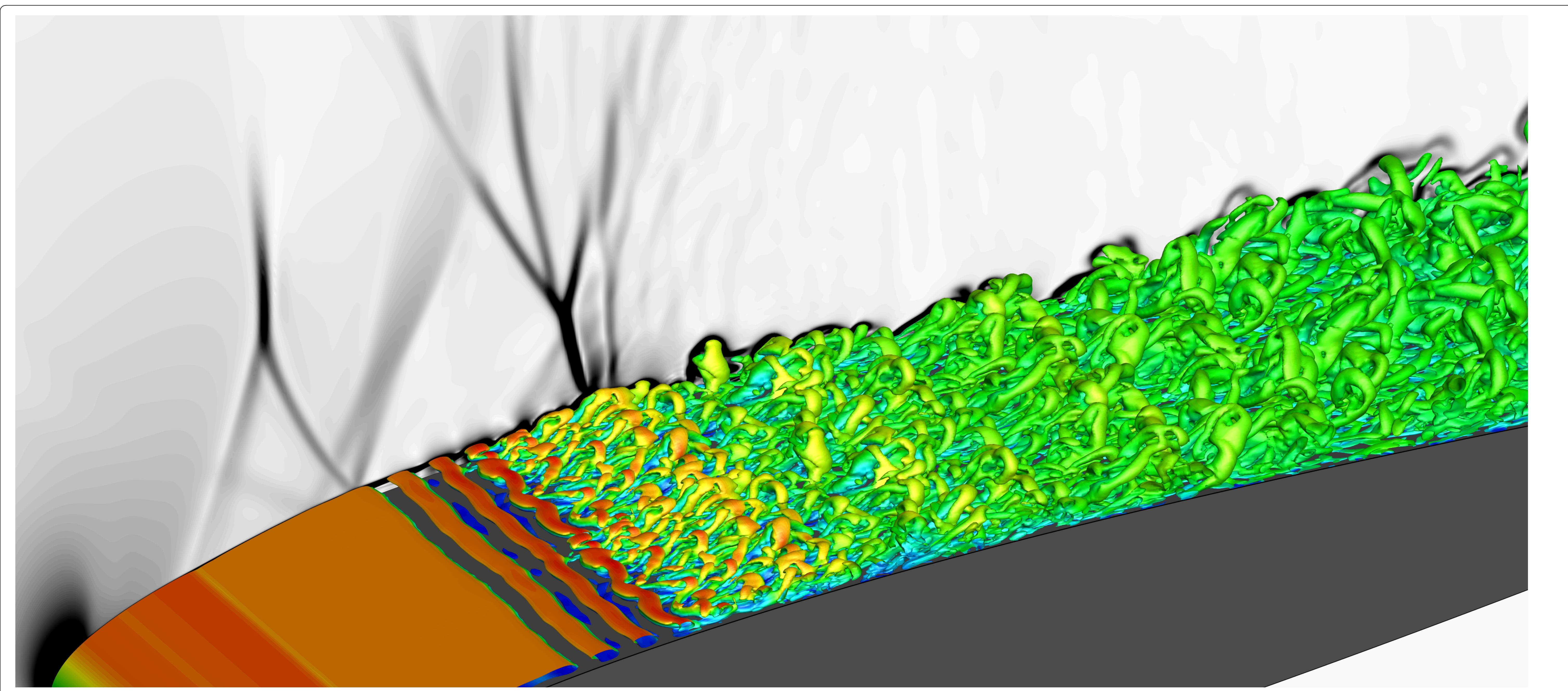


Structured High-Order Computational Kernel

for Direct Numerical Simulation of compressible flows



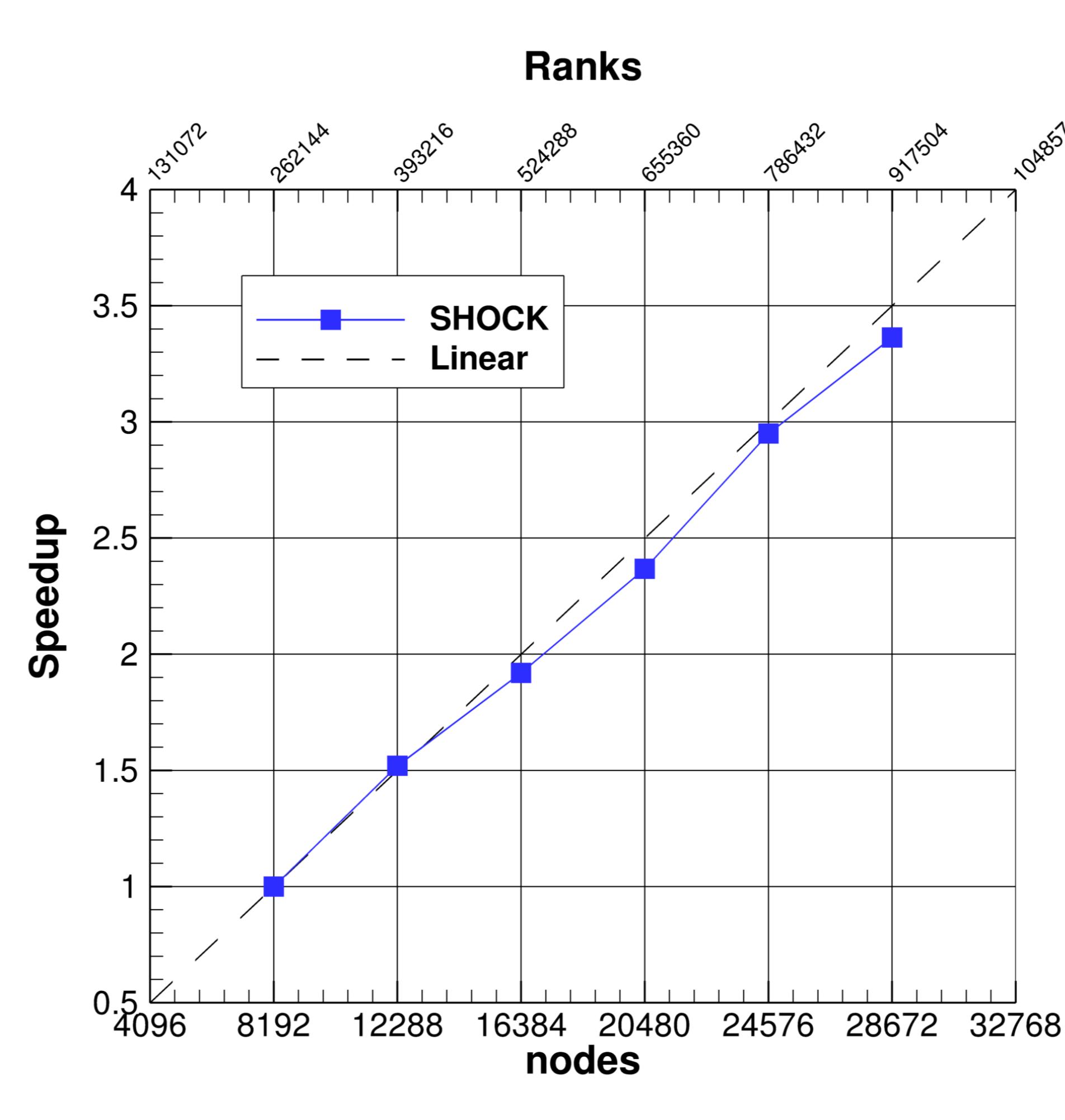
Direct Numerical Simulation

Flow Model:

- compressible, unsteady
- viscous (Navier-Stokes) or inviscid (Euler)
- three-dimensional, two-dimensional with rotational symmetry or two-dimensional
- curvilinear coordinates (including subzones with rotated coordinate systems)

High-Order Discretisation Methods:

- 5th and 9th order WENO scheme (inviscid)
- Lax-Friedrichs flux-vector splitting
- 6th and 10th order central scheme (viscous)
- 3rd and 4th order Runge-Kutta (time)



Scalability

- SHOCK is member of the **High-Q Club** (Highest Scaling Codes on JUQUEEN [FZ Jülich])
- 458,752 cores (1,835,008 compute threads) on BlueGene/Q (JUQUEEN)

Programming language

- C
- pure MPI (asynchronous)
- I/O in parallel HDF5 (CGNS)

Tested on platform

- Bull-Cluster (RWTH Aachen)
- BlueGene/Q (FZ Jülich)

Code development

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