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Virtual Air Particle (VAP) Model

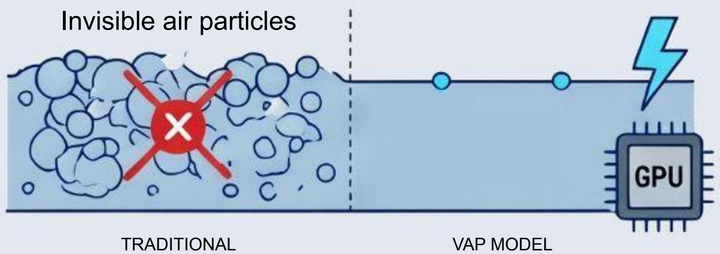
Highest 2-phase CFD precision at 1-phase speed

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Conventional multiphase CFD solvers waste up to 99% of their computational power simulating invisible air particles and suffer from instabilities at interfaces. The Virtual Air Particle (VAP) model solves this problem: It calculates drag, dynamic pressure, and droplet alignment purely analytically on the GPU – for robust simulation data with the efficiency of a single-phase simulation.

Multiphase precision at 1-phase speed

99 % Computation time savings



Completely eliminates air particles and calculates dynamic pressure as well as drag analytically directly on the GPU

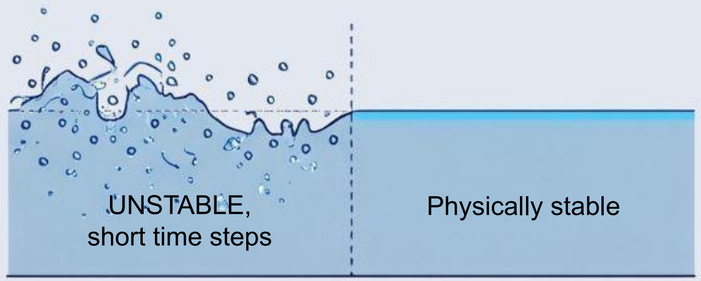
1-phase simulation speed



The VAP model delivers exact aerodynamic behavior at minimal computational effort by reducing the calculation to the essentials.

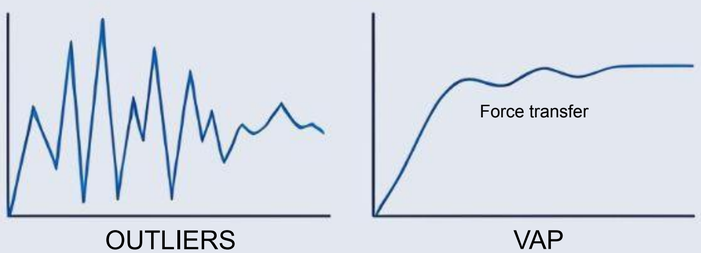
Absolute stability without interface instabilities

Density jump 1000:1 mastered



Resolves the failure of classical solvers at the water-air interface without reduced time steps

Outlier-free simulation data



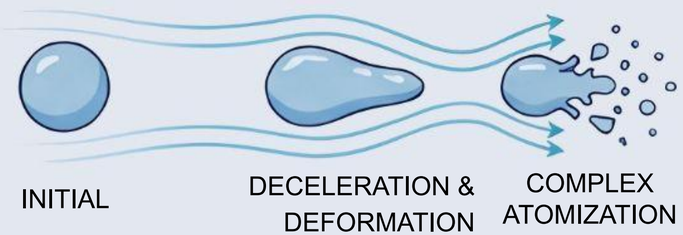
Guarantees a continuous, physically stable force transfer to the water surface

Uncompromising spray and droplet physics



Individual particle and droplet detection
Detects every single water droplet and calculates its specific degree of exposure

Aerodynamic droplet deformation



Simulates the true-to-scale deceleration of fine spray and complex atomization.