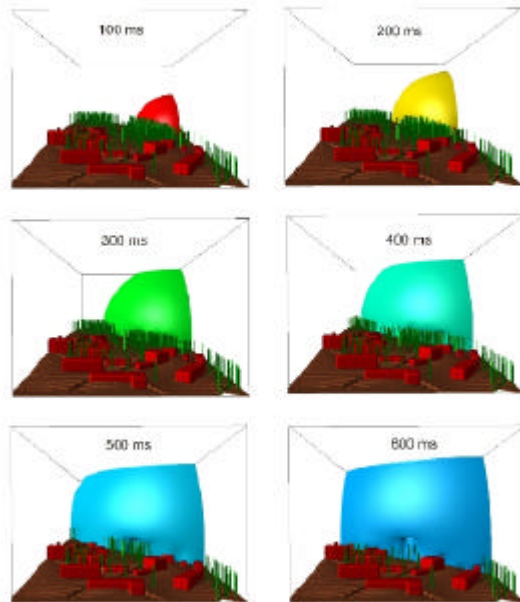


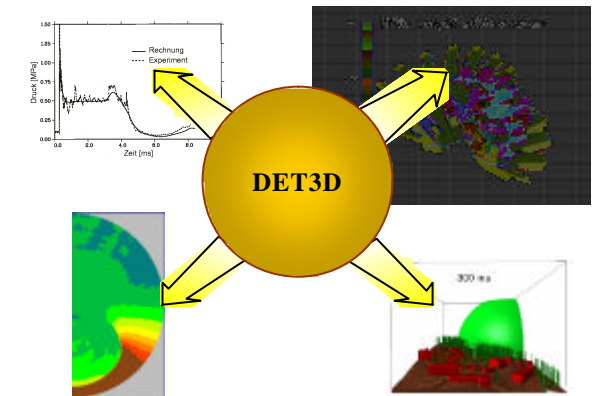
Propagation of detonation wave in a flat valve geometry.

HYDROGEN SIMULATION & SOLUTIONS

APPLICATION



Advancing blast wave front from an unconfined hydrogen-oxygen explosion starting at lower right rear corner.



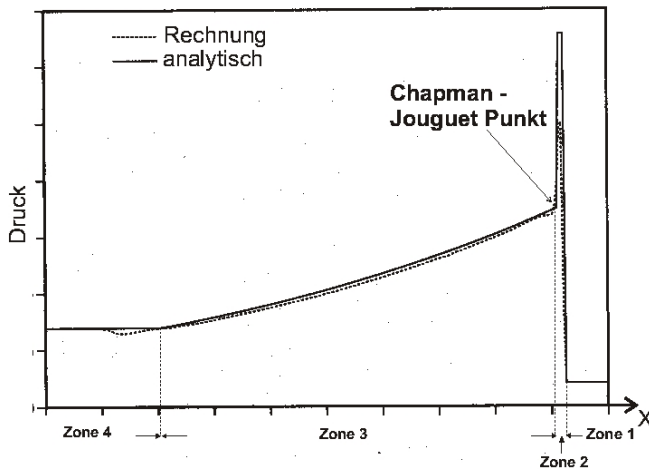
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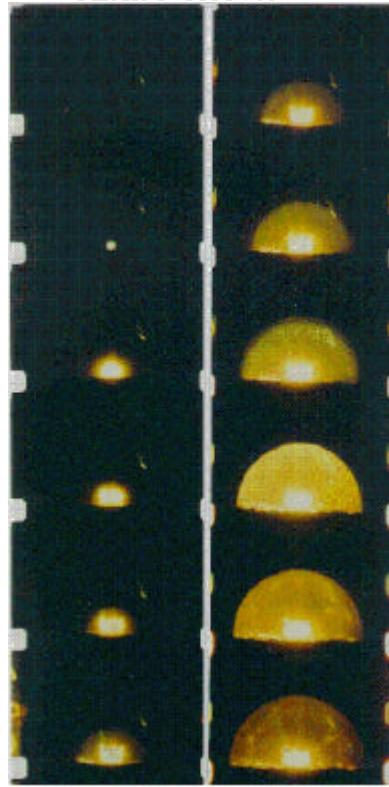
DET3D

- ❖ Numerical solution of Euler conservation equations with chemical reactions in complex 3D geometries
- ❖ Multicomponent gas mixtures
- ❖ TVD hydrodynamics solver, 2nd order
- ❖ Arrhenius combustion kinetics
- ❖ Regular cartesian mesh
- ❖ Fully parallelized code (MPI), written in C

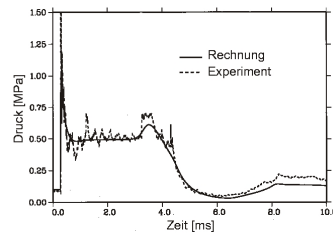


Pressure profile of 1D detonation wave. Comparison of calculated with analytic CJ-solution.

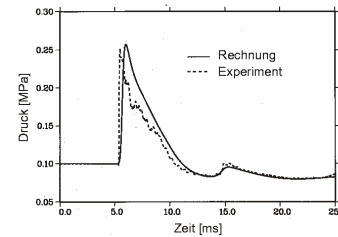
VERIFICATION



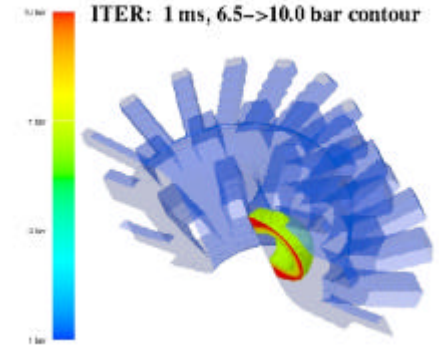
Hydrogen-Air detonation in a balloon of 6 m diameter, central ignition.



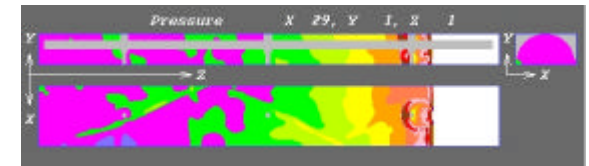
Comparison between calculation and experiment. Pressure-time histories inside and outside balloon hemisphere.



APPLICATION



3D-geometry of ITER fusion reactor with expanding spherical detonation wave



Snapshot of detonation wave in the Vacuum Vessel Pressure Suppression System (VVPSS) of the planned ITER-FEAT fusion reactor. Shown are three orthogonal 2D-cuts through the VVPSS. Ignition was at left corner.