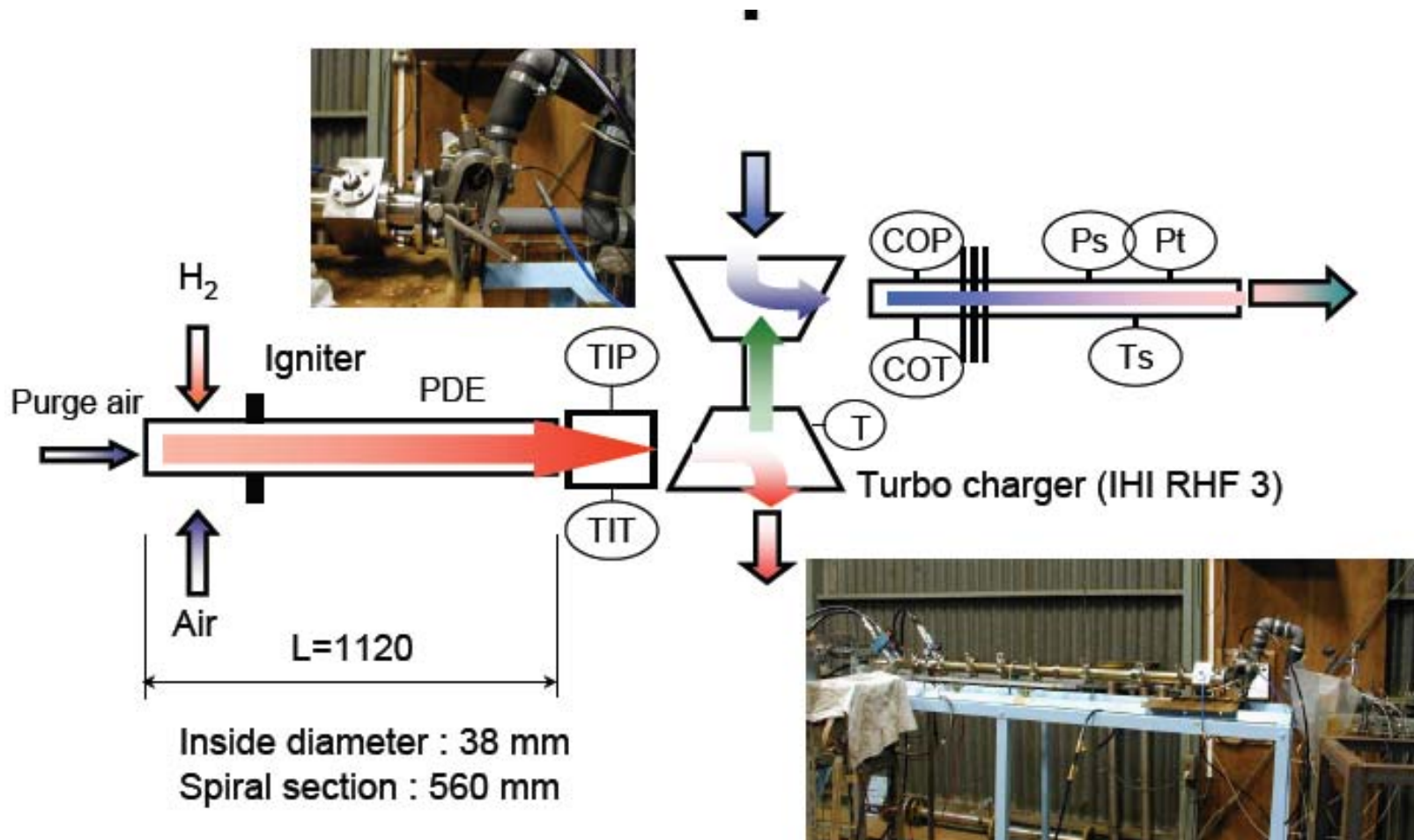


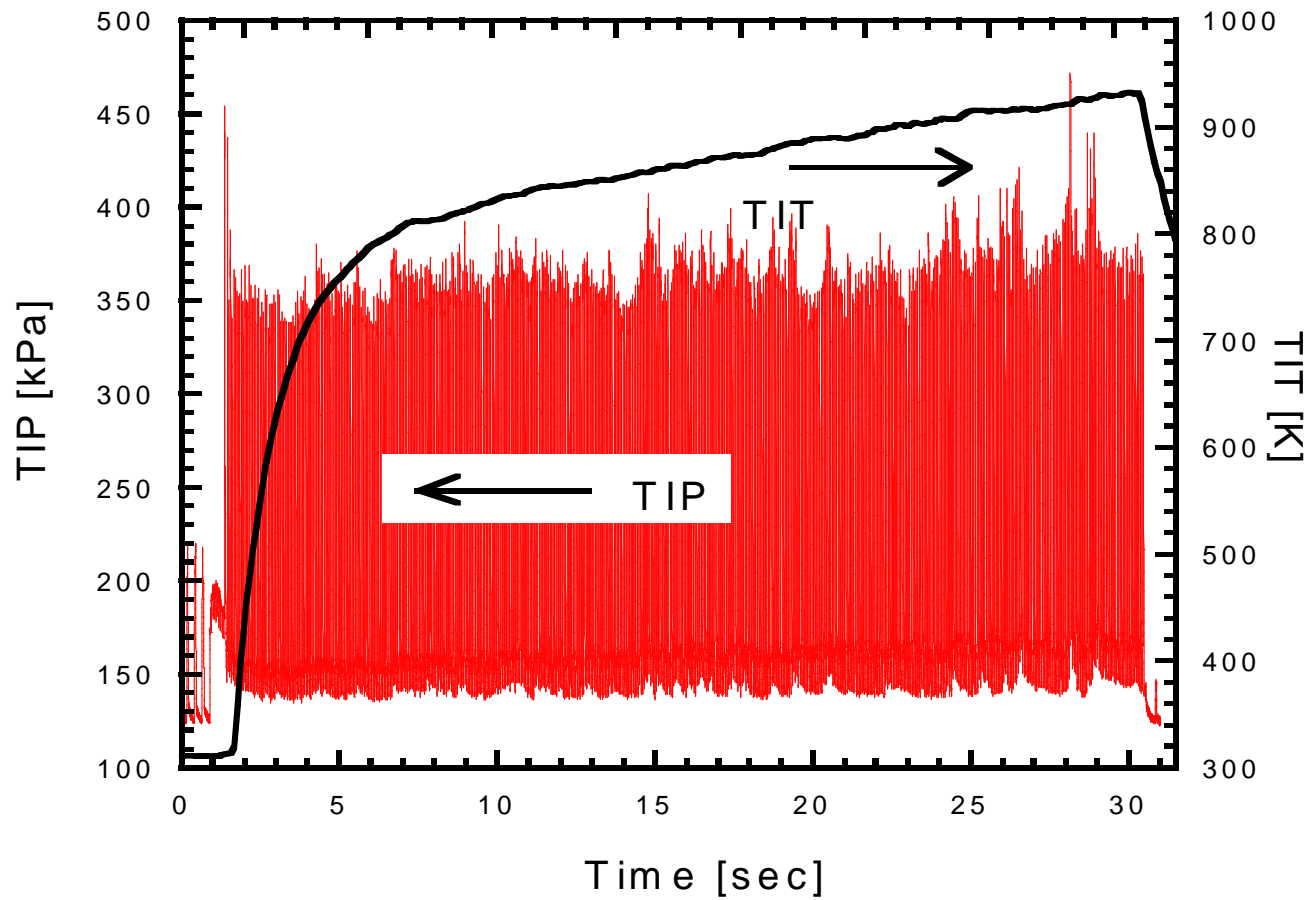
Pulse Detonation Studies in Japan (2007)

Toshi Fujiwara
Nagoya University and FF Lab

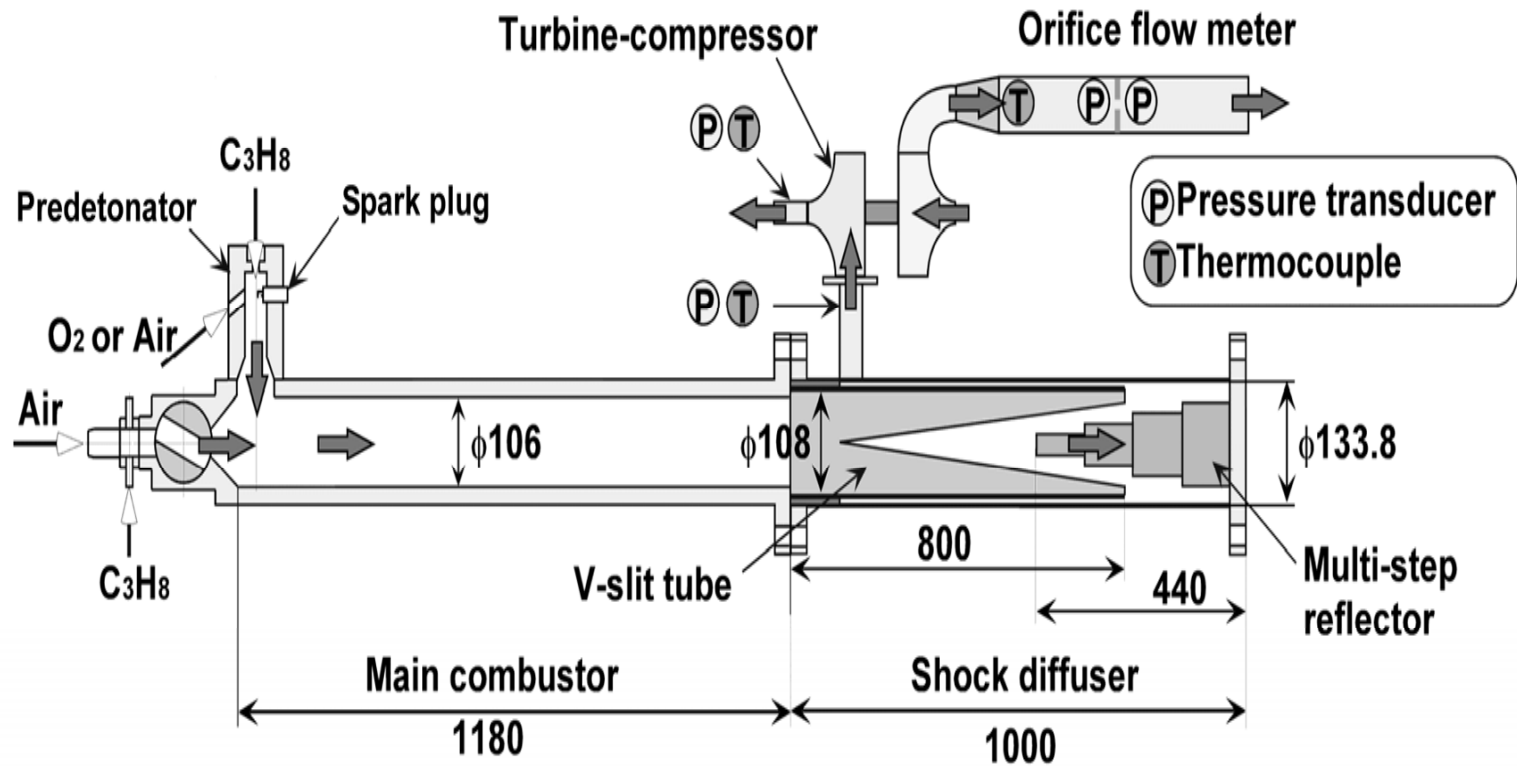
Experimental Setup for Pulse Detonation Turbine Engine [3, 4]



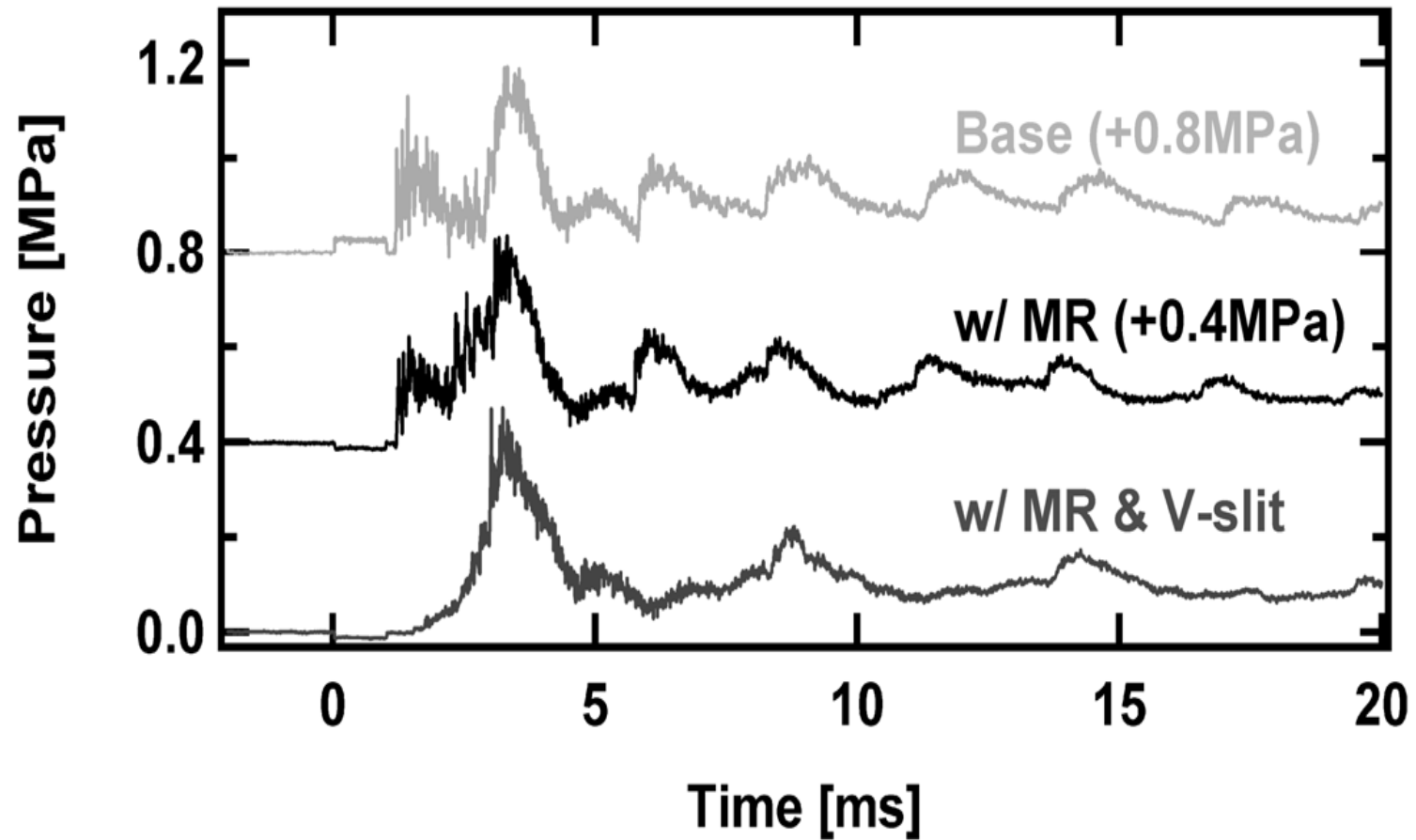
Turbine Inlet Pressure and Temperature for Hydrogen-Air 20Hz Operation



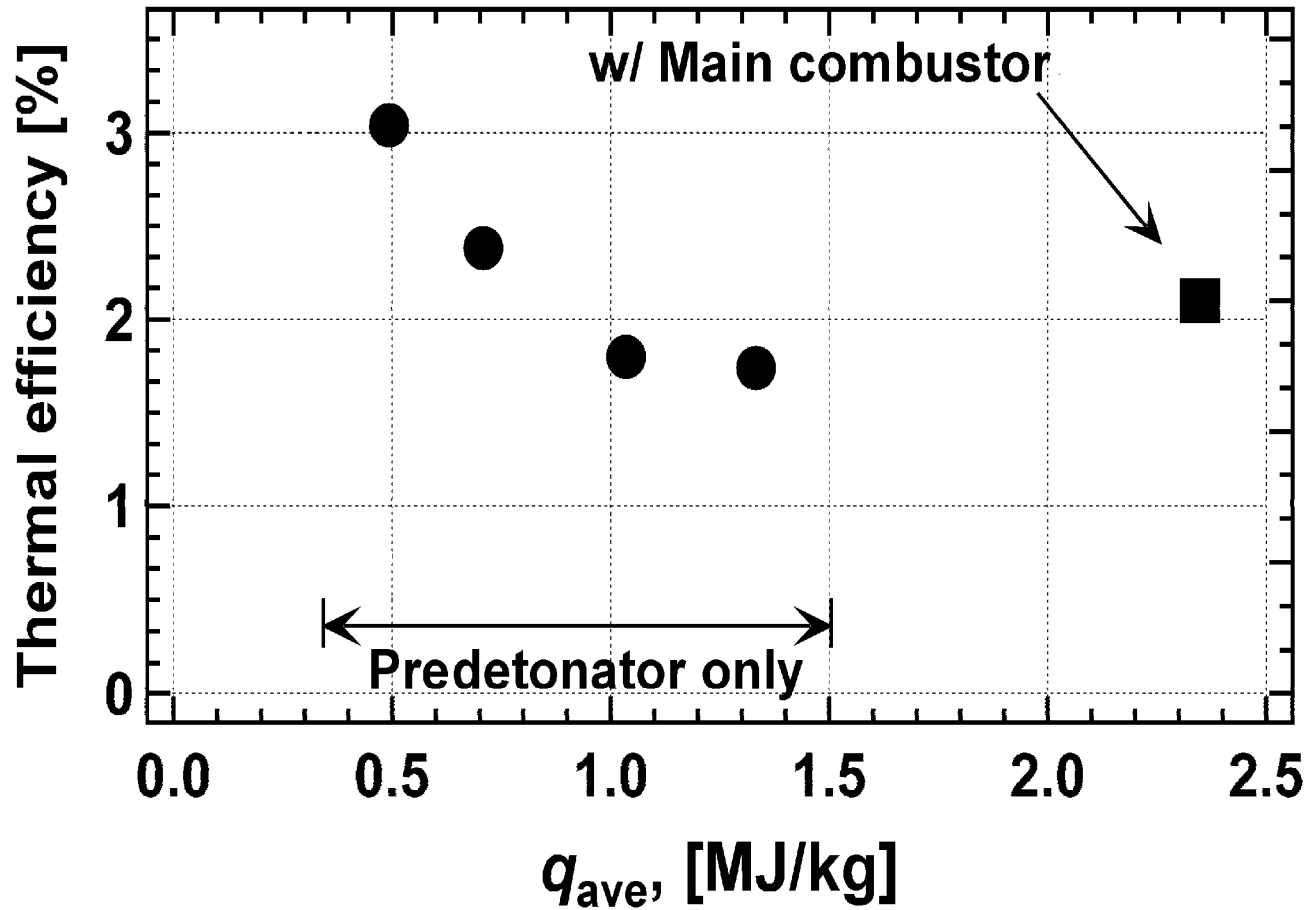
Experimental Device of PDTE Using a Single-Cylinder PDE



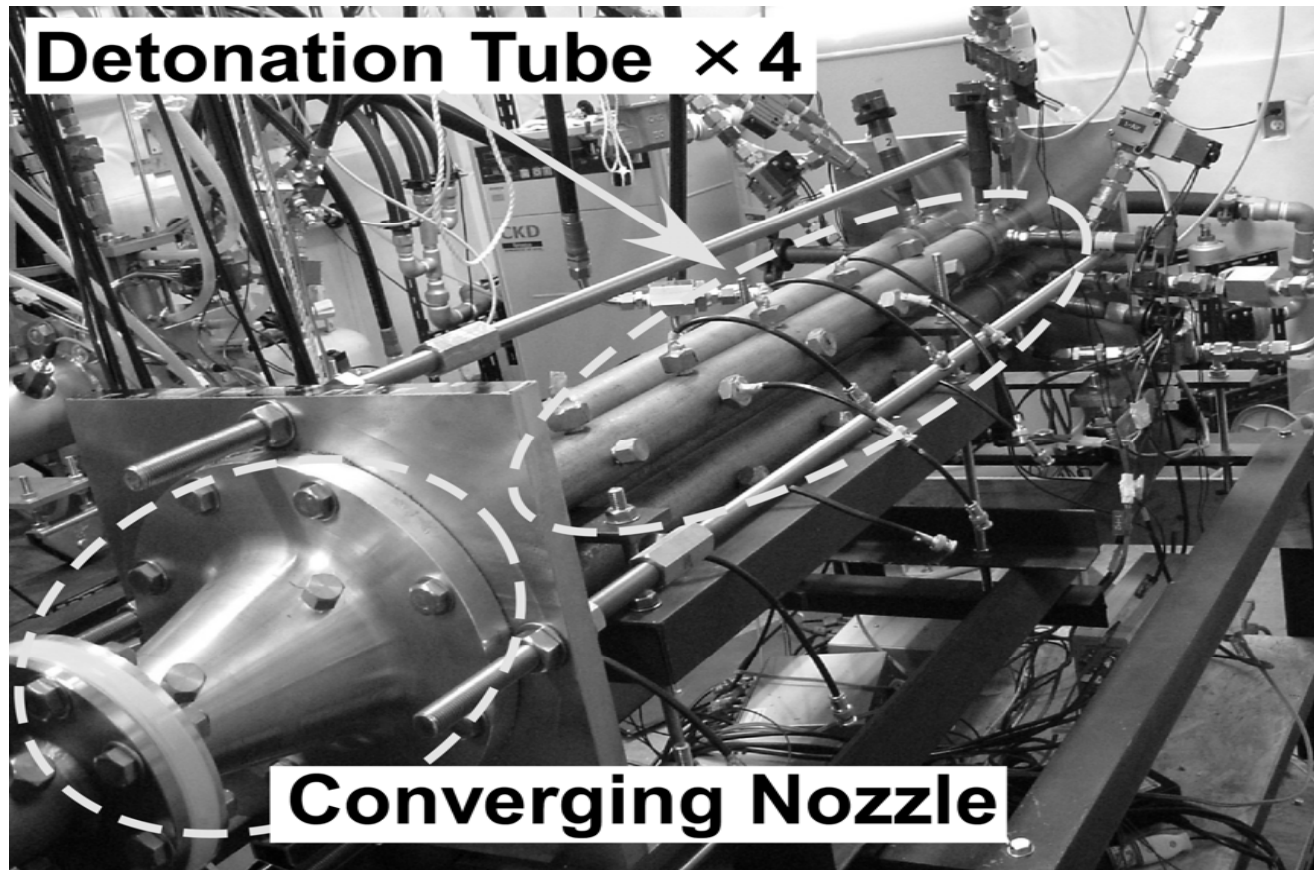
Influence of Shock Diffuser: Pressure History at Turbine Inlet



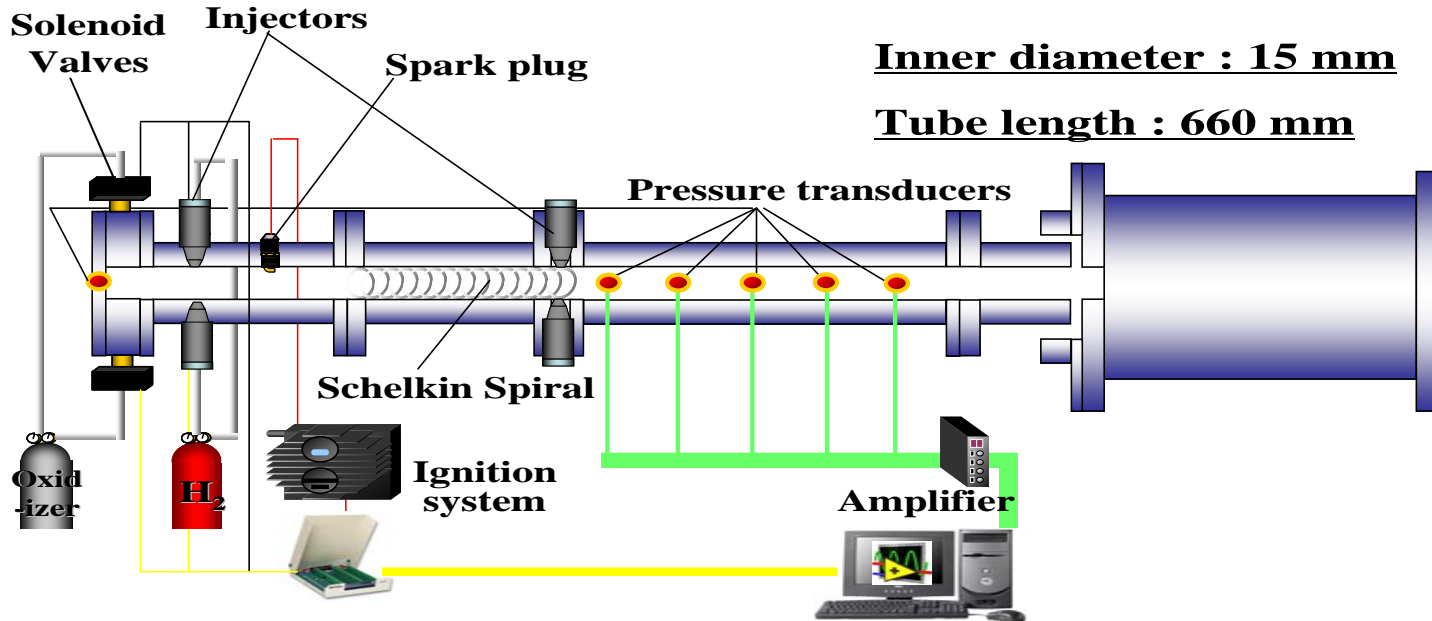
Thermal Efficiency Measured by Single-Cylinder PDTE



Four-Cylinder PDE Developed for PDTE

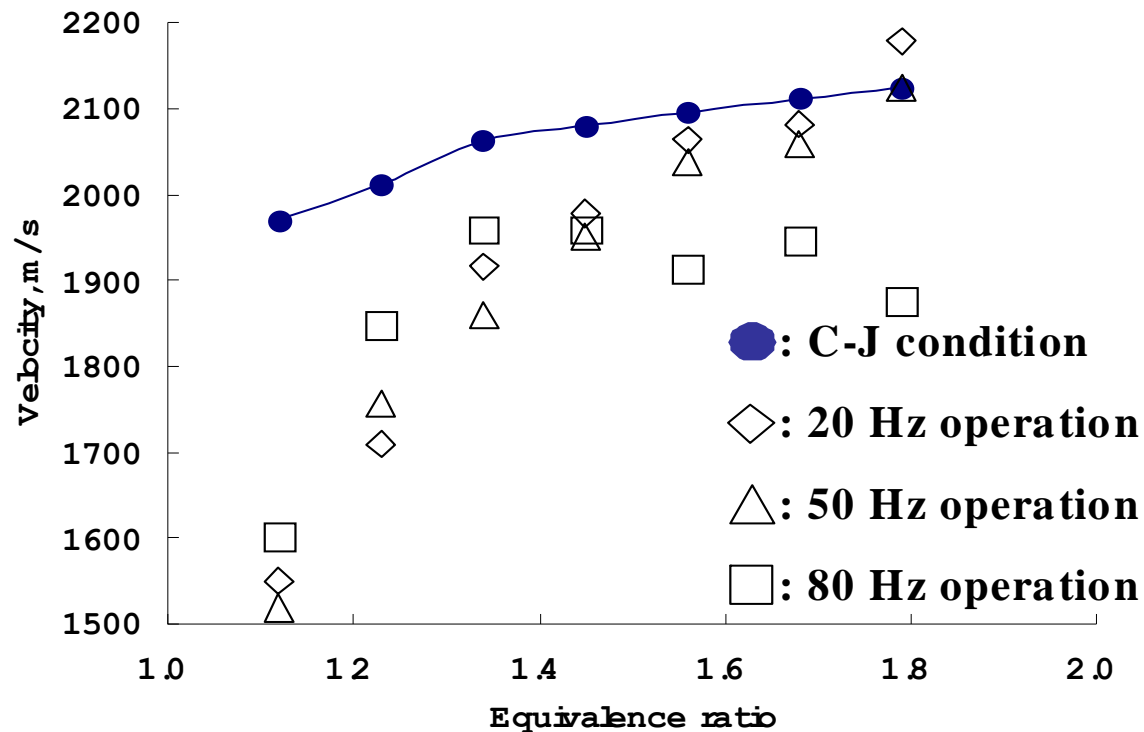


Schematic of Micro PDE and Experimental conditions

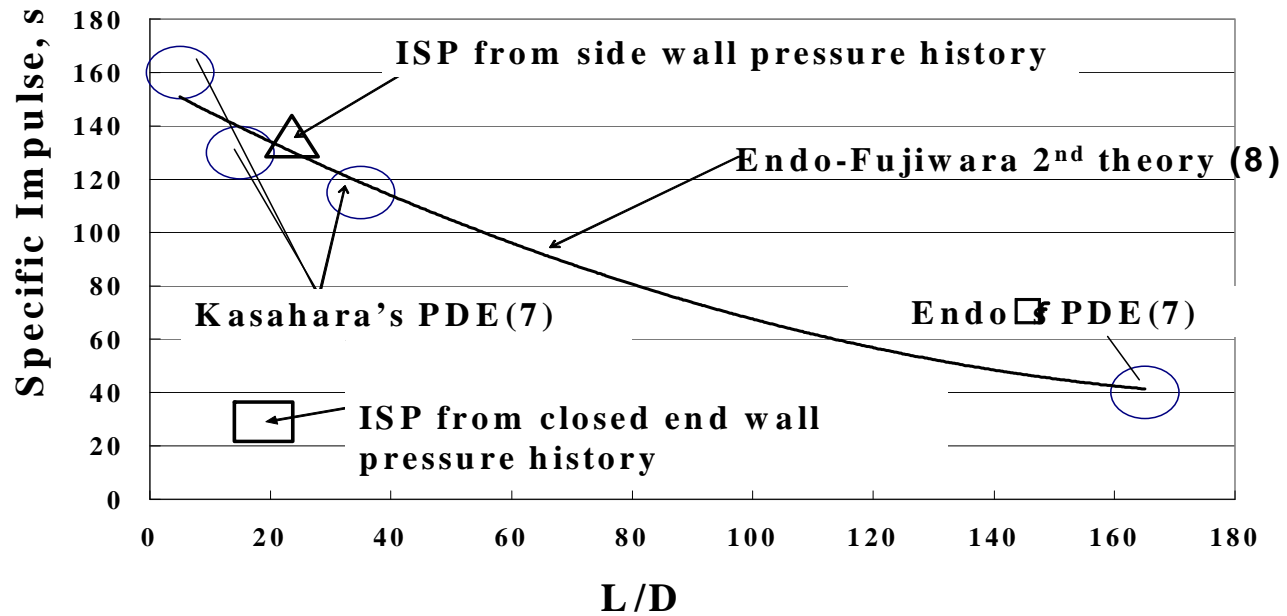


| | |
|-------------------|------------------------------|
| Fuel | H ₂ |
| Oxidizer | Air |
| Frequency | 20, 50, 60, 70, 80 Hz |
| Equivalence ratio | 1.34, 1.45, 1.56, 1.68, 1.79 |
| Flow rate | 12.8 l/s |
| contraction ratio | 1.9 |
| expansion ratio | 4.1 |

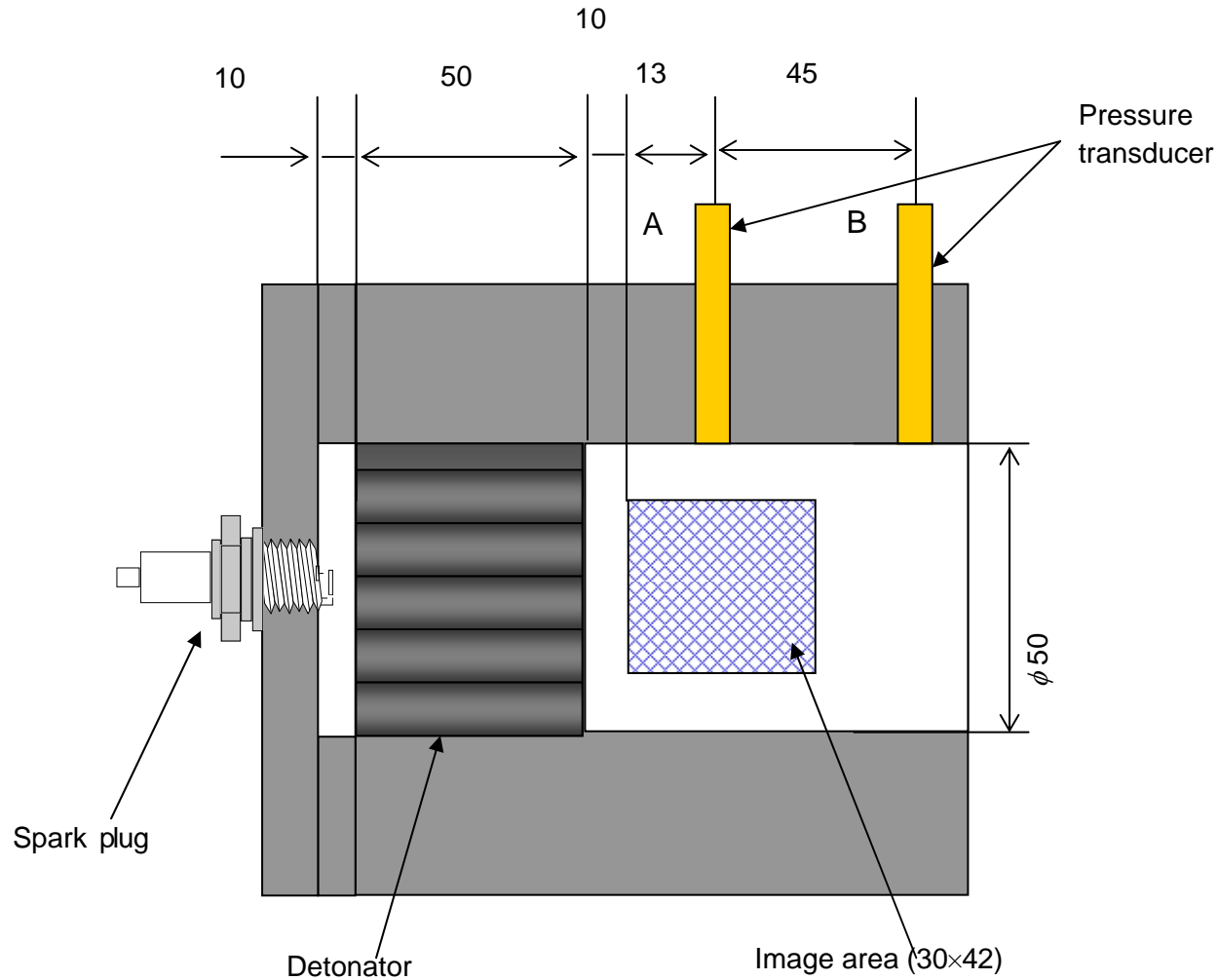
Combustion Wave Propagating Velocities versus Equivalence Ratio for Various Frequencies



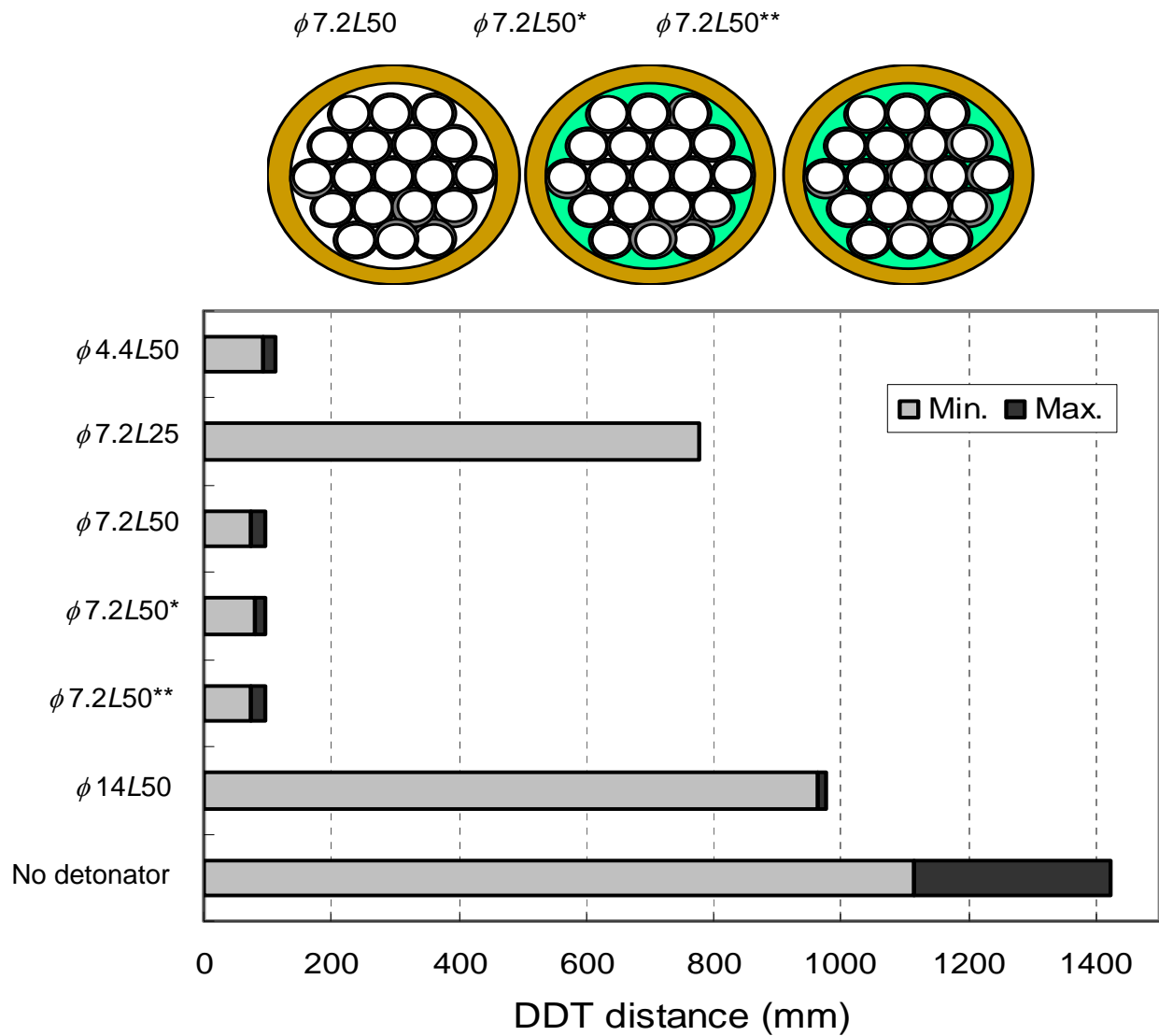
Specific impulses versus L/D



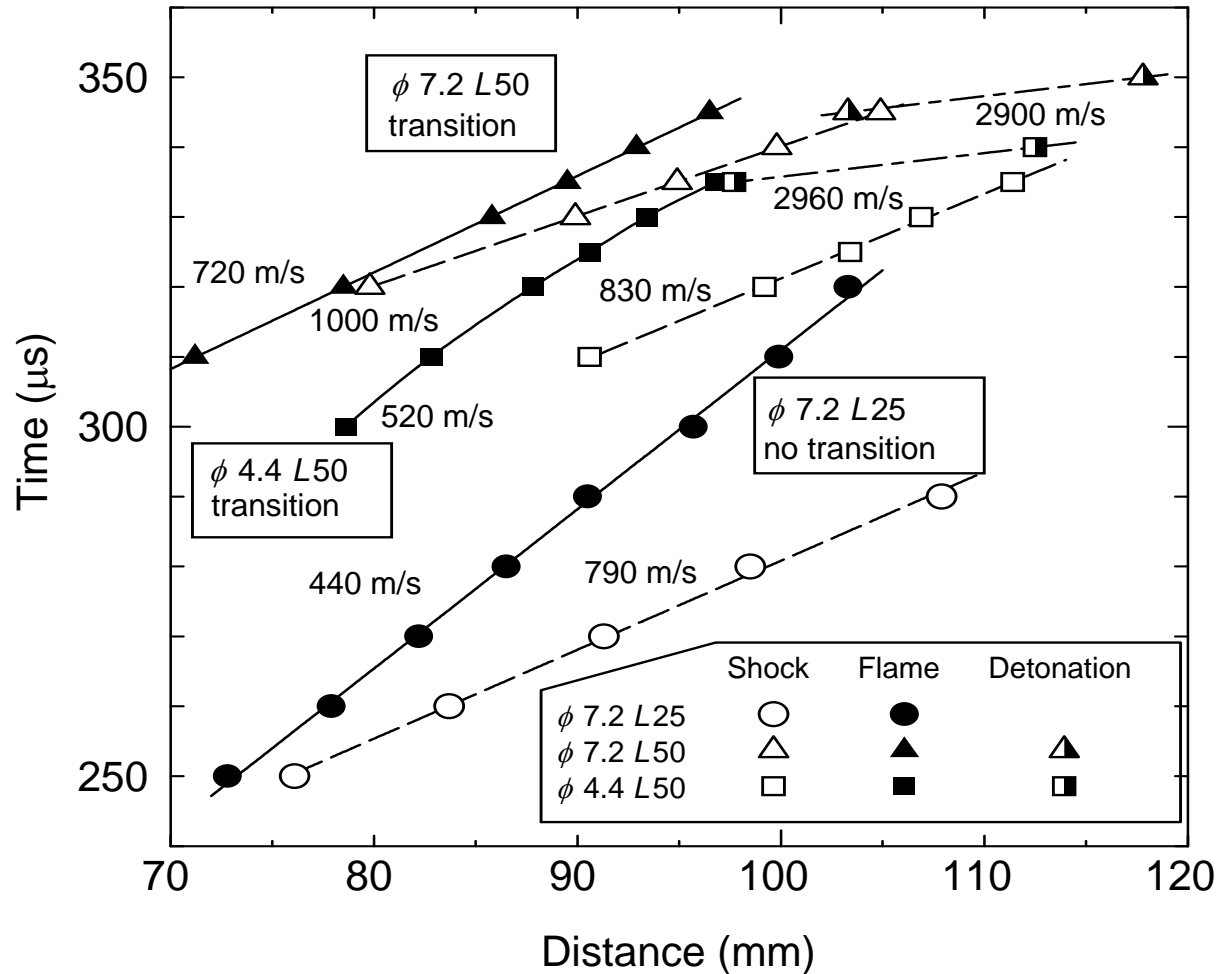
Short Multiple Tubes Attached Right behind Spark Plug



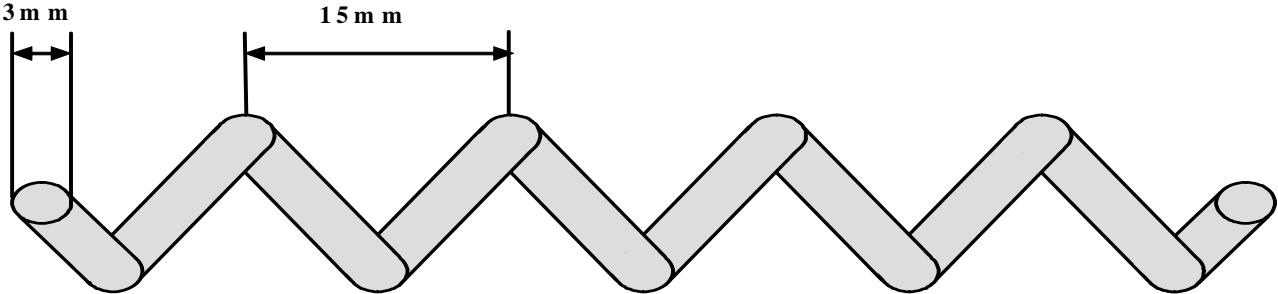
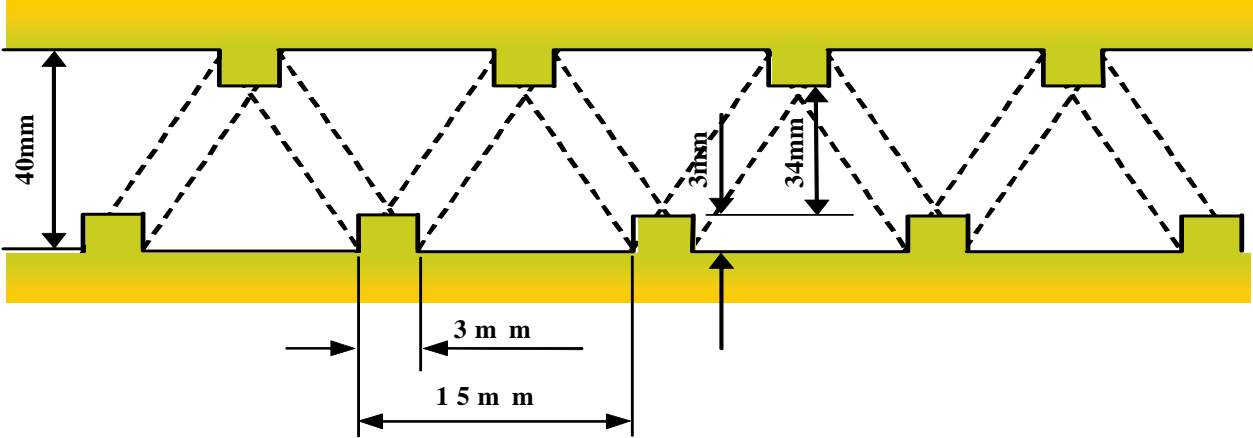
Influence of Multiple Tubes Geometry on DDT Distance



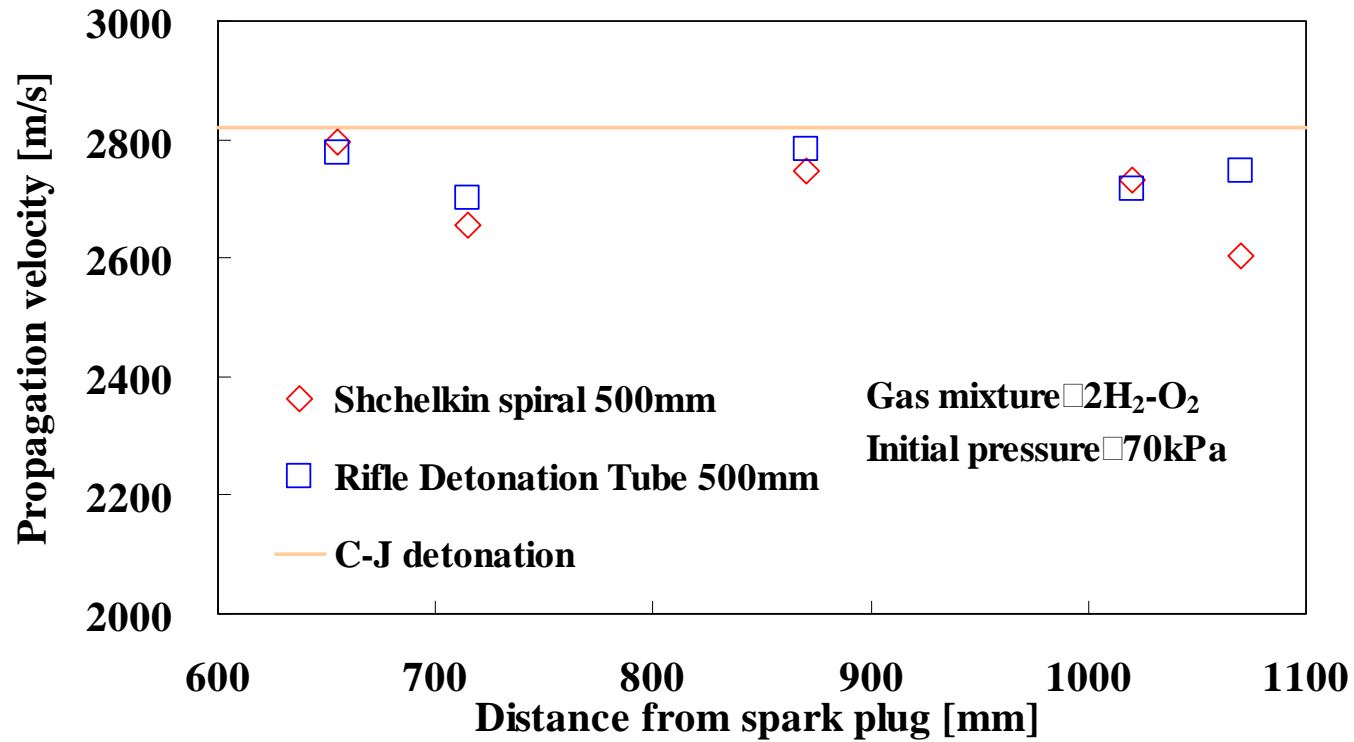
x-t Diagrams of Shock Waves, Flames and Detonation Fronts



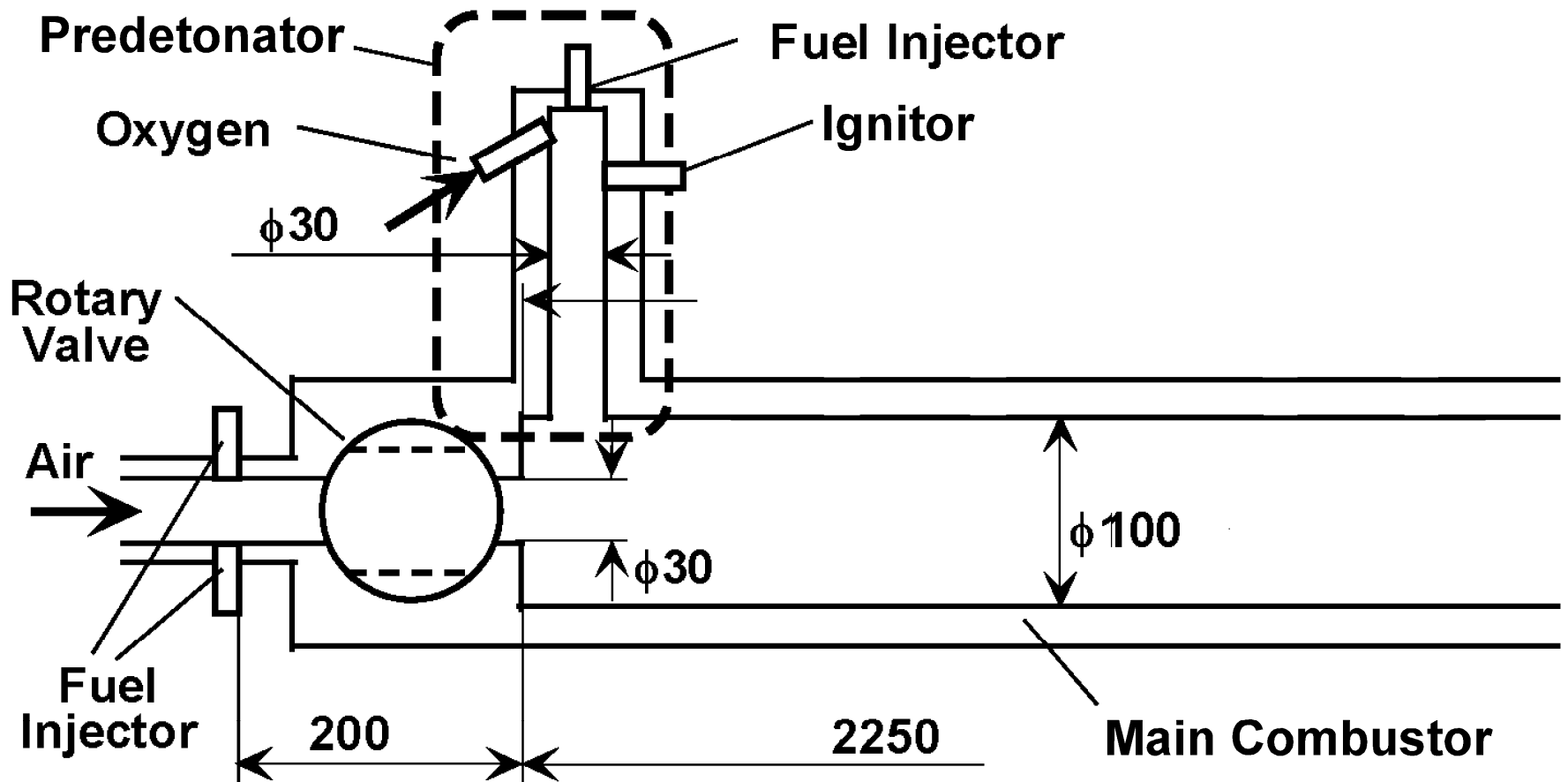
(a) Rifle Groove and (b) Shchelkin Wire



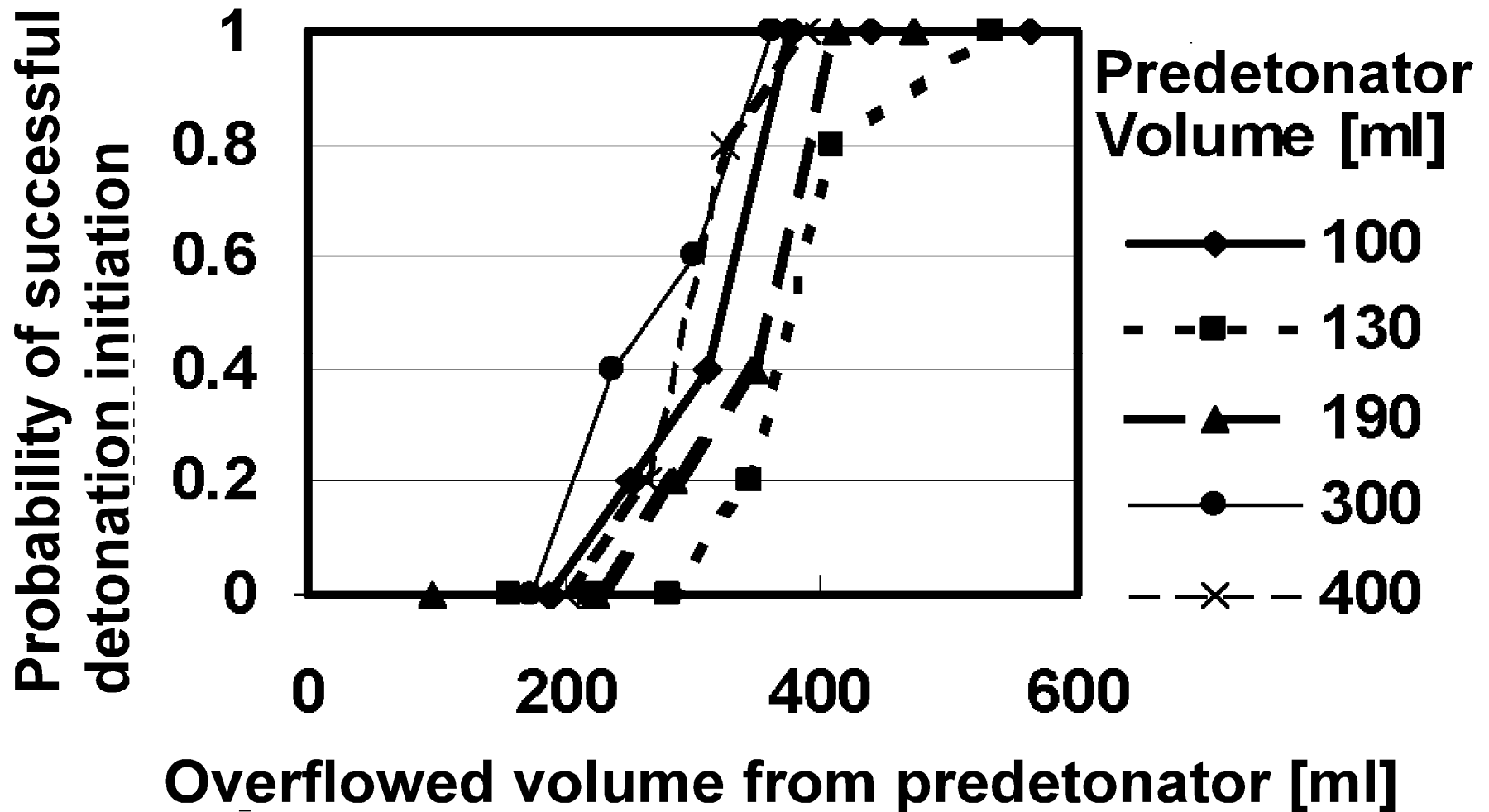
Comparison between Rifle Groove and Shchelkin Wire



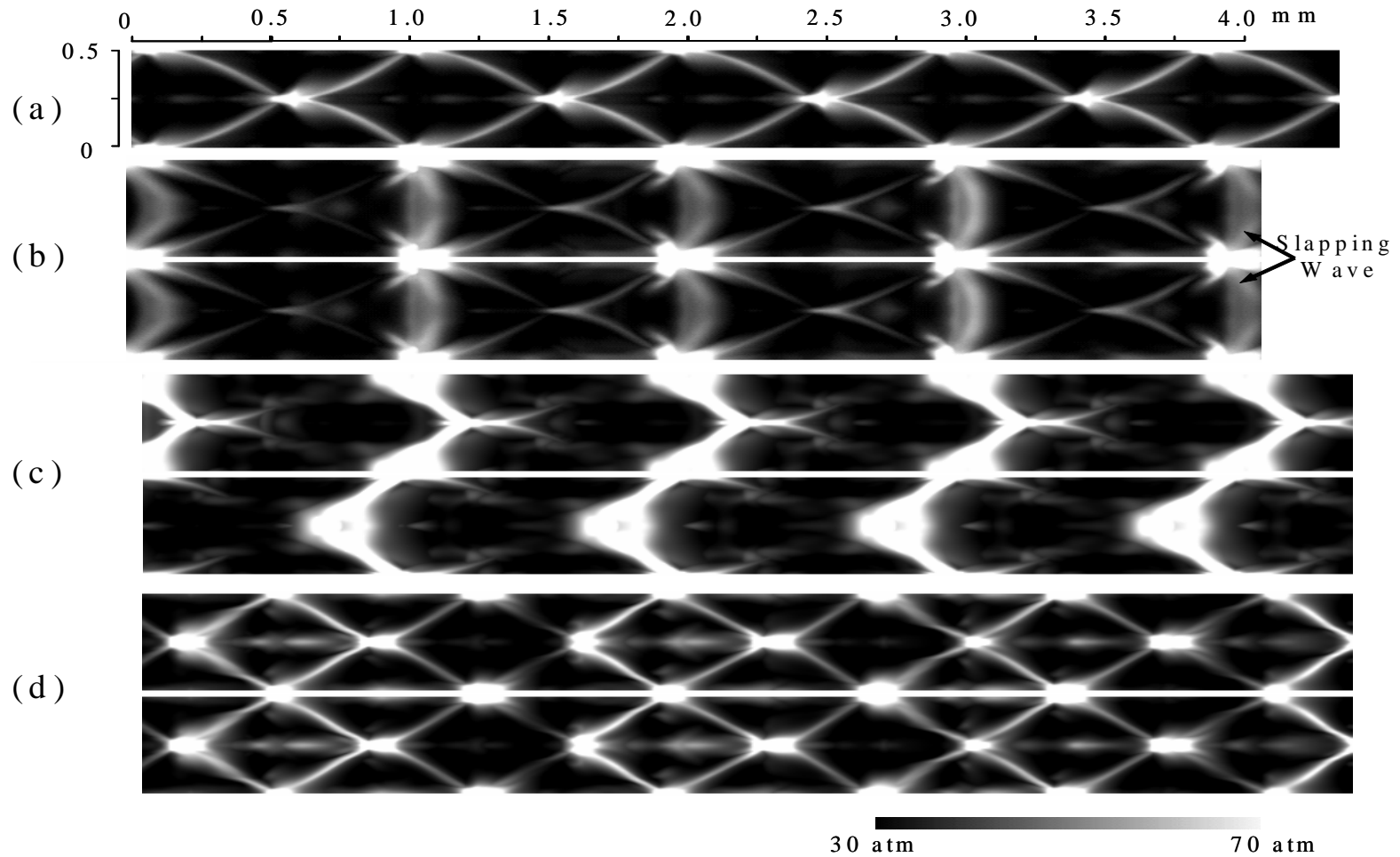
Schematic of Perpendicular Predetonator



Importance of Overflowed Volume for Direct Initiation

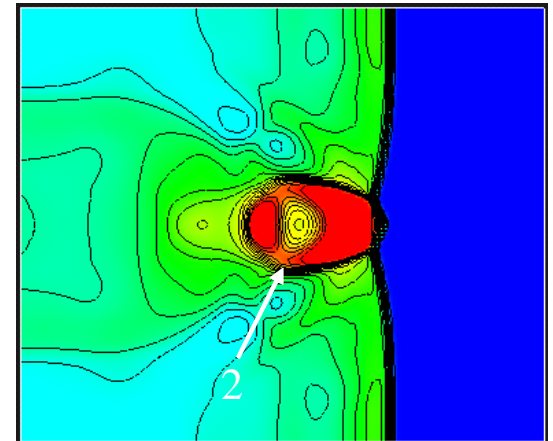
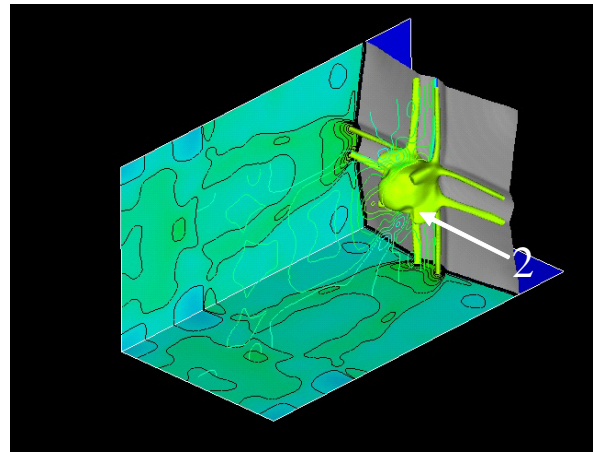
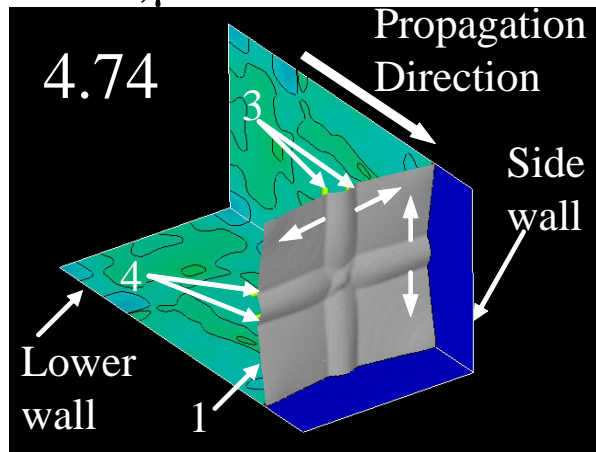


Computed Smoke-foil Records. (a) 2-D Results, (b) 3-D Results for “Rectangular Mode in Phase”, (c) 3-D Results for “Rectangular Mode Partially out of Phase”, (d) 3-D Results for “Diagonal Mode”



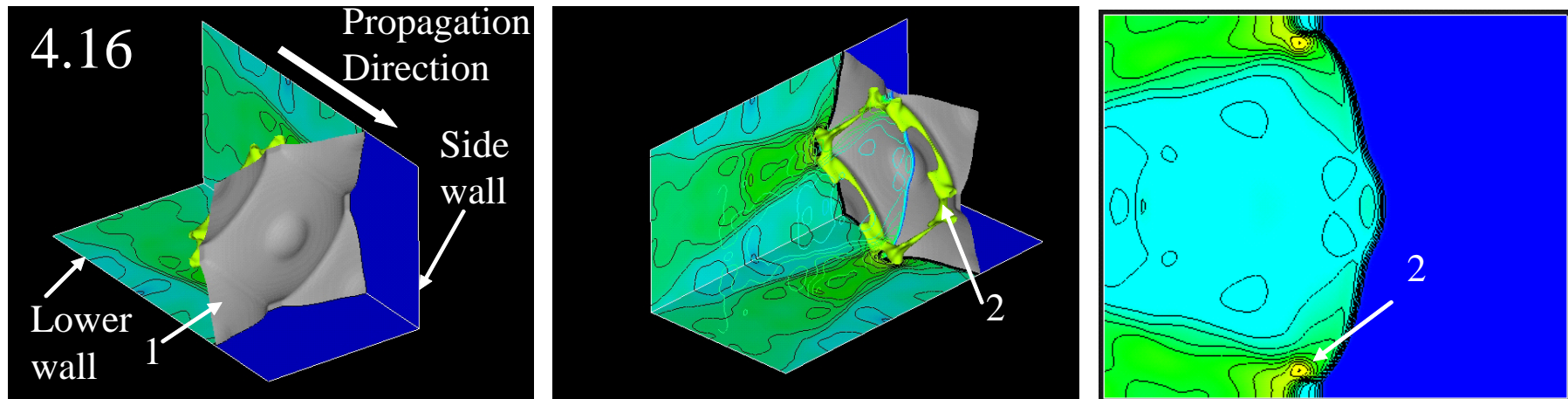
Pressure-Space Isosurface and Contours in front of and behind Detonation for “Rectangular Mode in Phase”

Time, μs

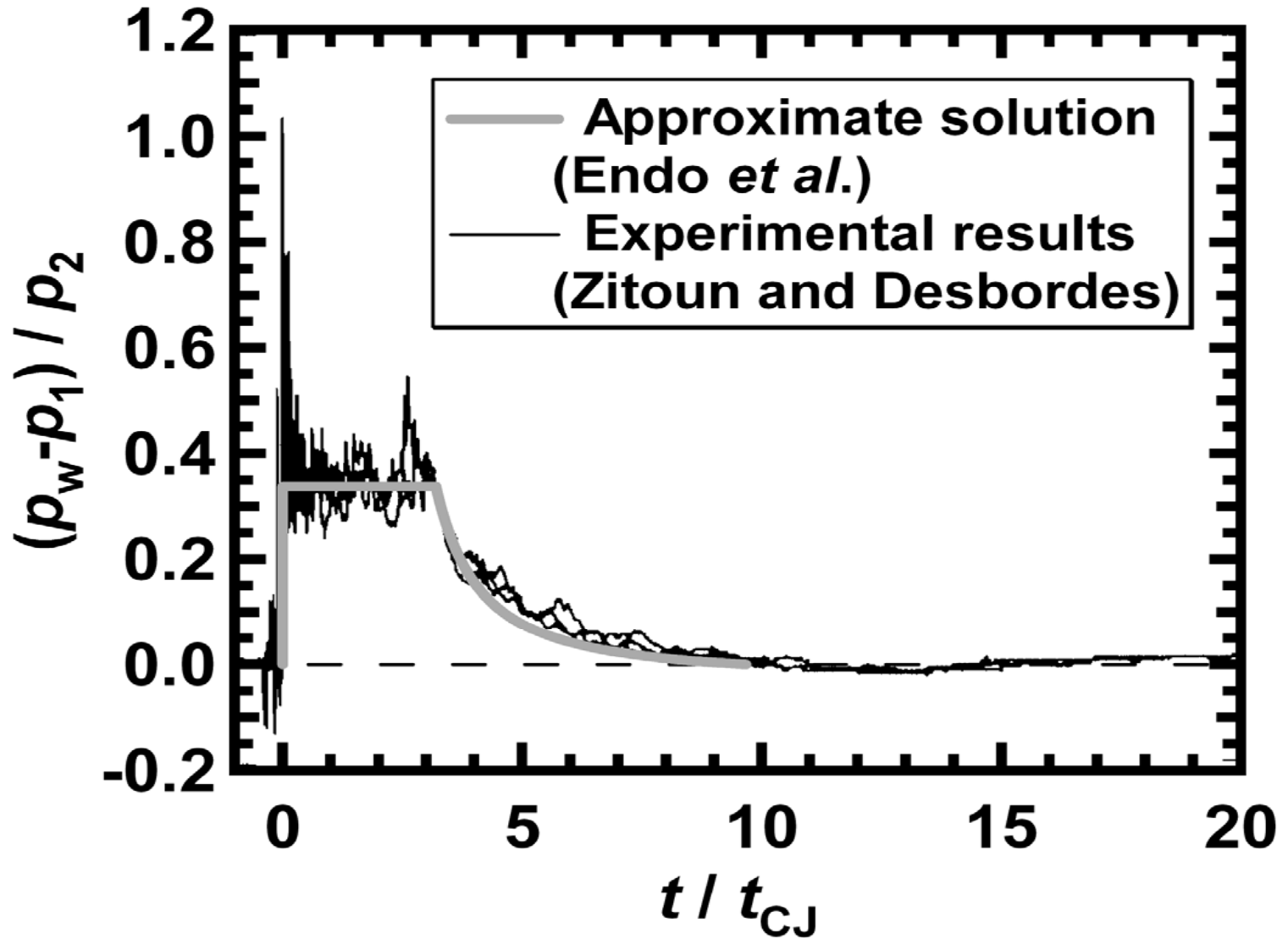


Pressure-Space Isosurface and Contours in front of and behind Detonation for Diagonal Mode

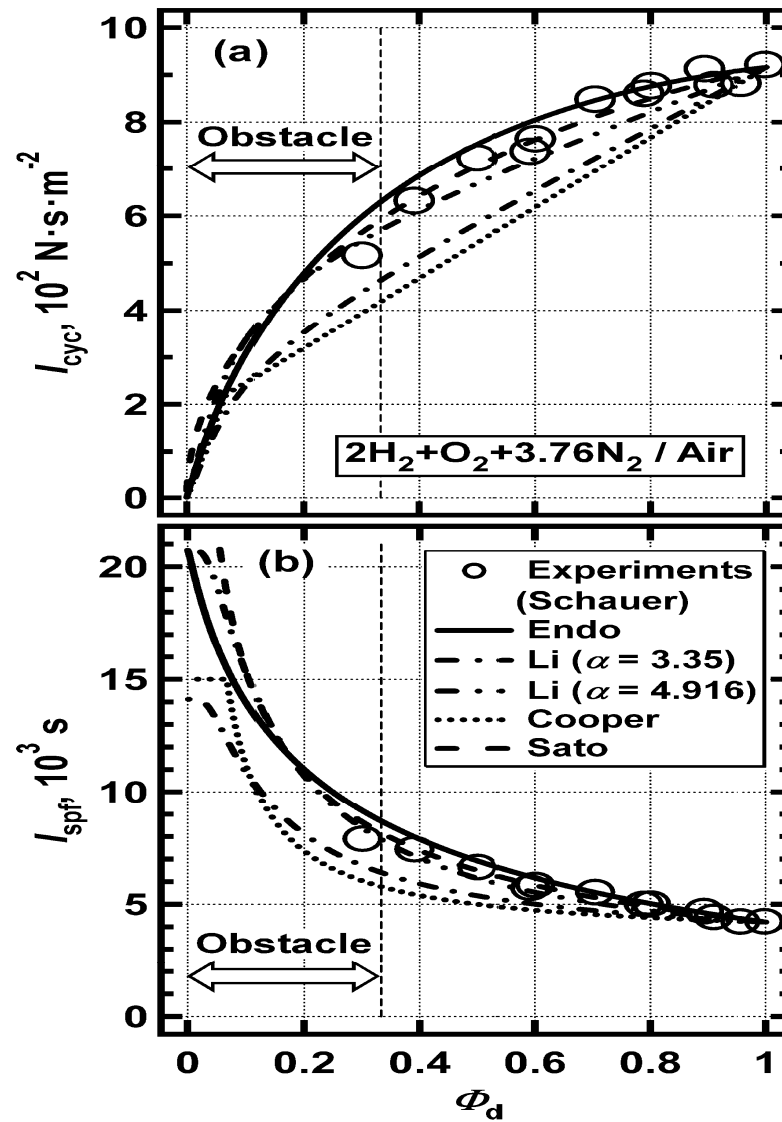
Time, μs



Pressure History on Closed End of PDE with Fully-filled Combustible Mixture



Impulse per Cycle and Fuel-based Impulse for Partially-filled PDE



Mixture-based Impulse for Partially-filled PDE: Ethylene-fuel

