

## Numerical analysis on atomization and spray combustion

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### ● Abstract

A numerical study is performed to clarify phenomena on atomization and spray combustion.

### ● Reasons and benefits of using JAXA Supercomputer System

Phenomena on atomization and spray combustion require a high calculation load, and the use of super computer is necessary.

### ● Achievements of the Year

Numerical simulations were performed to investigate combustion instabilities on a coaxially-staged lean-burn fuel injector.

Pressure oscillation amplitudes and dominant oscillation frequencies obtained by the CFD and by the corresponding experiment were generally in good agreement.

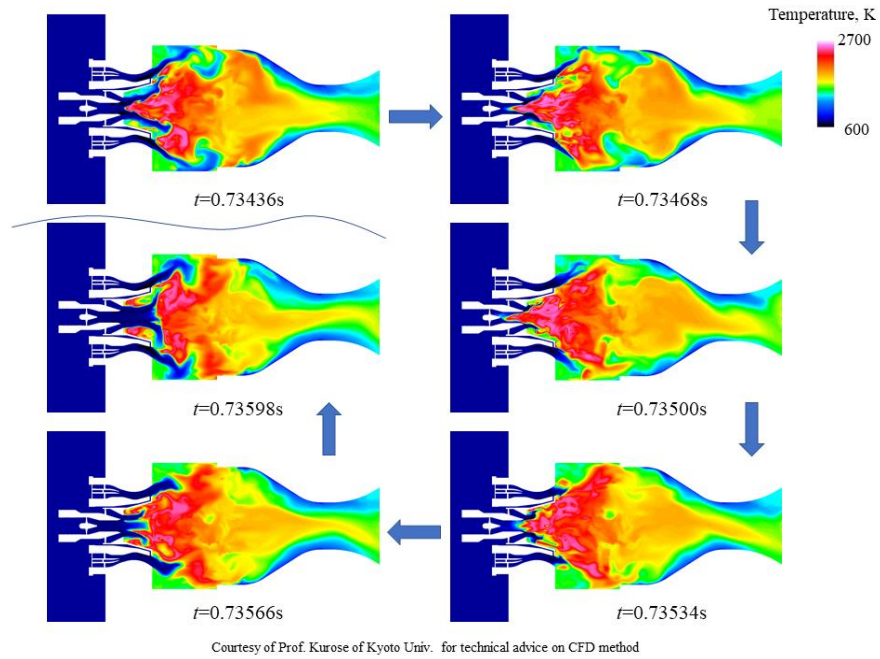


Fig. 1: Time evolution of temperature distribution during an oscillation cycle.

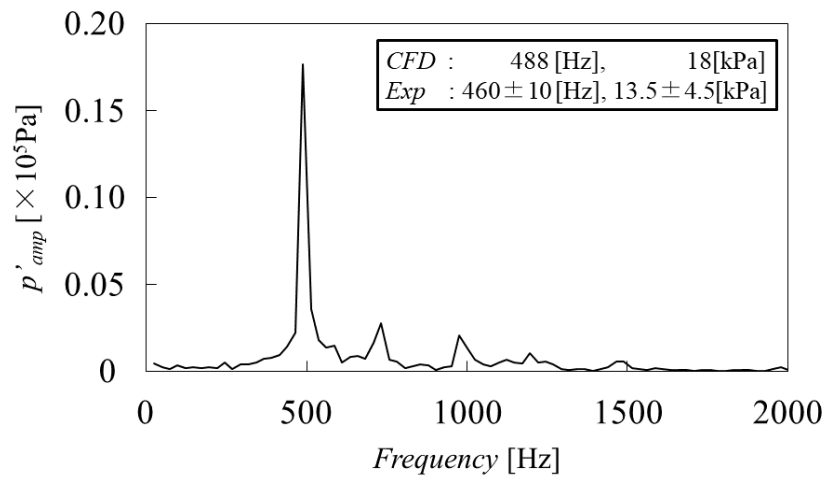


Fig. 2: Frequency spectrum of pressure in the combustion chamber.

● Publications

N/A

● Usage of JSS

● Computational Information

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	512
Elapsed Time per Case	120 Hour(s)

● JSS3 Resources Used

Fraction of Usage in Total Resources\*1(%): 1.22

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage*2(%)
TOKI-SORA	28,964,176.41	1.41
TOKI-ST	37,251.97	0.05
TOKI-GP	0.00	0.00
TOKI-XM	0.00	0.00
TOKI-LM	910.92	0.07
TOKI-TST	0.00	0.00
TOKI-TGP	0.00	0.00
TOKI-TLM	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage*2(%)
/home	258.84	0.26
/data and /data2	26,337.77	0.28
/ssd	126.71	0.03

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2(%)
J-SPACE	0.09	0.00

\*1: Fraction of Usage in Total Resources: Weighted average of three resource types (Computing, File System, and Archiver).

\*2: Fraction of Usage : Percentage of usage relative to each resource used in one year.

● **ISV Software Licenses Used**

ISV Software Licenses Resources		
	ISV Software Licenses Used (Hours)	Fraction of Usage*2(%)
ISV Software Licenses (Total)	0.00	0.00

\*2: Fraction of Usage : Percentage of usage relative to each resource used in one year.