

**Study of Green engine (study of ultrahigh-temperature low NOx emission combustor technology) atomization process of a fuel spray nozzle in a practical geometry**

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● **Abstract**

The atomization process occurs in the narrow region which is vicinity of the injection outlet in a practical geometry fuel injector under development in Green engine project. Therefore, it is difficult to understand the atomization phenomena only by experiment. The objective of this work is to understand the atomization mechanism by numerical study which calculated the atomization field in the near region of the injection outlet.

● **Reasons for using of JSS2**

The particle diameter is order of 10 micron in the experiment. In order to calculate this size of atomization field precisely,

large scale calculation with more than a few of hundred million of cells which size is a few micron meter order is needed and

the use of super computer is necessary.

● **Achievements of the Year**

Numerical analysis with VOF method of the fuel atomization field is conducted and revealed the condition of the particles broken up from different speed of cross-flow jets.

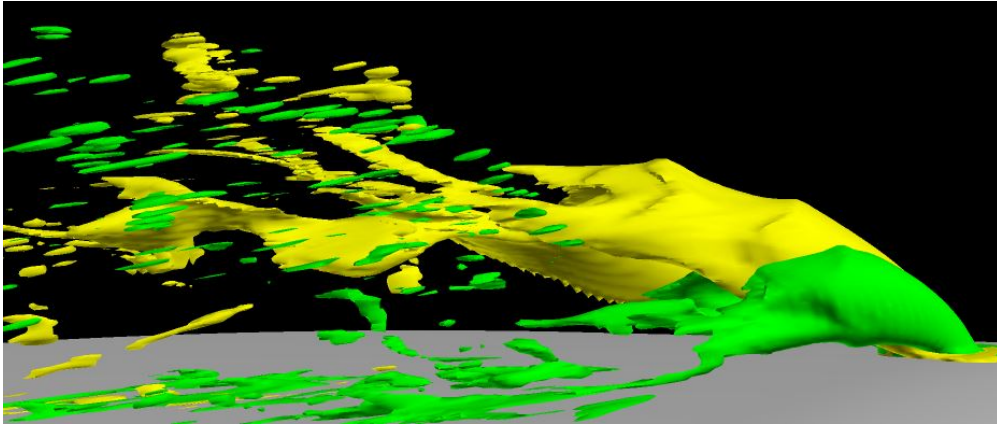


Fig.1 Atomization process of fuel spray nozzle in a practical geometry. Side view  
(Green:High speed cross flow jet, Yellow:Low speed cross flow jet)

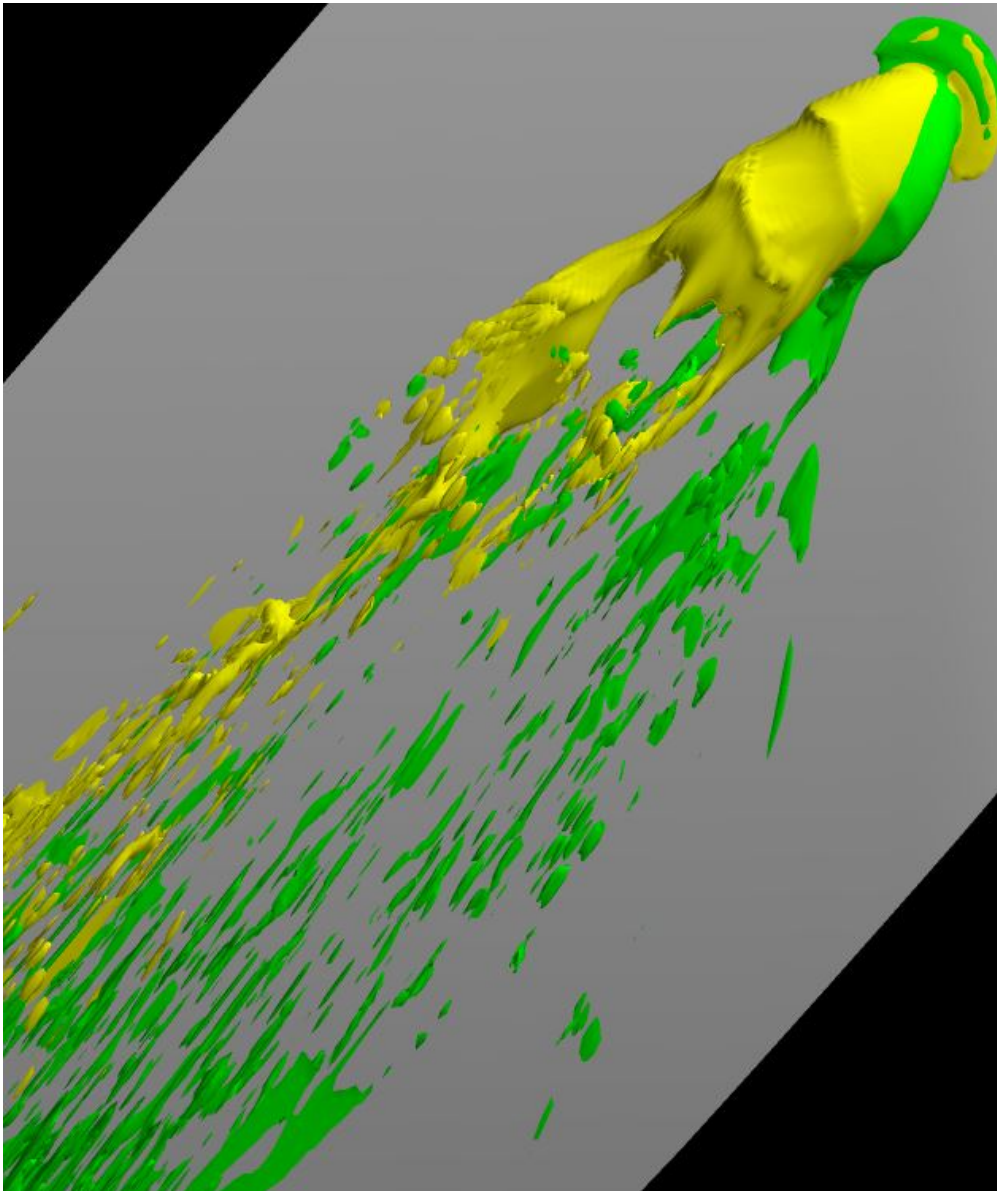


Fig.2 Atomization process of fuel spray nozzle in a practical geometry. Upper view  
(Green:High speed cross flow jet, Yellow:Low speed cross flow jet)

● **Publications**

N/A

● **Usage of JSS2**

● **Computational Information**

Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	768
Elapsed Time per Case	140.00 hours

● **Resources Used**

Fraction of Usage in Total Resources\*1 (%): 1.60

Details

Computing Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2 (%)
SORA-MA	13,261,007.18	1.76
SORA-PP	0.00	0.00
SORA-LM	0.00	0.00
SORA-TPP	0.00	0.00

File System Resources		
File System Name	Storage assigned(GiB)	Fraction of Usage*2 (%)
/home	120.43	0.08
/data	32,610.17	0.60
/ltmp	5,099.83	0.38

Archiver Resources		
Archiver System Name	Storage used(TiB)	Fraction of Usage*2 (%)
J-SPACE	0.14	0.01

\*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