# 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**

The atomization phenomenon requires a high calculation load, and the use of super computer is necessary.

● **Achievements of the Year**

The numerical simulation of a planer prefilming air-blast atomaization was conducted. Due to the poor grid resolution, it was turned out that the breakup phenomenon of the ligaments to droplets could not be captured adequately. Based on these numerical simulation results, next numerical simulation will be conducted with finer grid size.
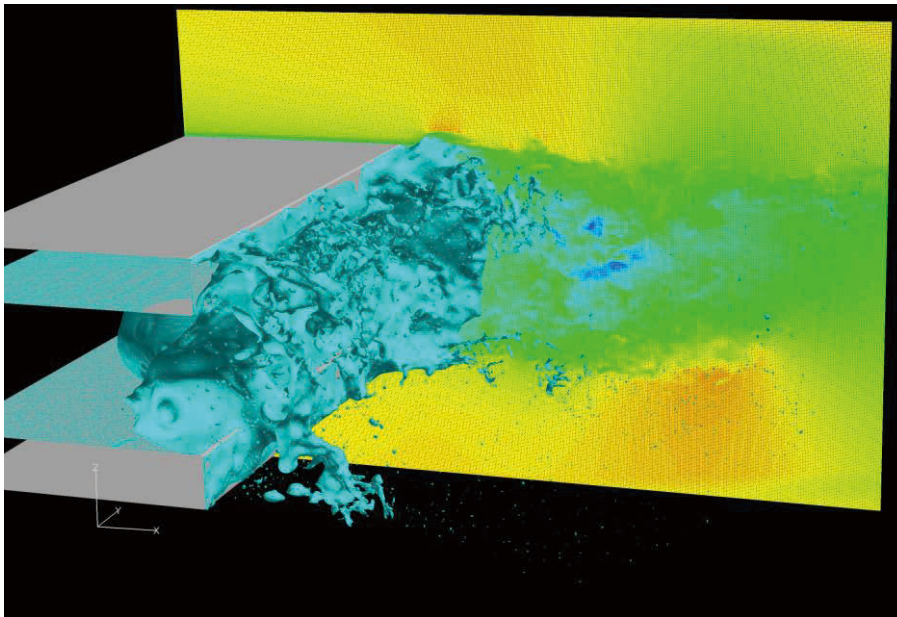
Fig. 1: Atomization of a planar liquid sheet with air flow.

● **Publications**

N/A

● **Usage of JSS2**

● **Computational Information**

| | |
|---|---|
| Process Parallelization Methods | MPI |
| Thread Parallelization Methods | OpenMP |
| Number of Processes | 96 - 768 |
| Elapsed Time per Case | 1000 Hour(s) |

● **Resources Used**

Fraction of Usage in Total Resources[*1](%): 1.15

Details

| Computational Resources | | |
|---|---|---|
| System Name | Amount of Core Time (core x hours) | Fraction of Usage[*2](%) |
| SORA-MA | 10,423,016.00 | 1.27 |
| SORA-PP | 2,046.18 | 0.01 |
| 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 | 325.29 | 0.27 |
| /data | 26,633.14 | 0.46 |
| /ltmp | 2,752.98 | 0.23 |

| Archiver Resources | | |
|---|---|---|
| Archiver Name | Storage Used (TiB) | Fraction of Usage*2(%) |
| J-SPACE | 0.11 | 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.