

乱流中の混合・反応過程とそのモデリング

乱流混合と化学反応

大気中の汚染物質濃度, 工業プラントの攪拌装置, エンジン内の燃焼

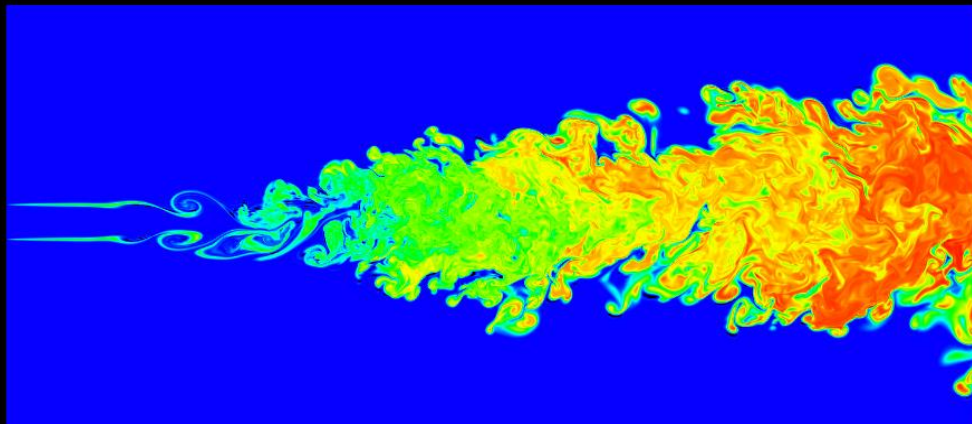
- **乱流拡散**・・・流体運動によるマクロスケールでの混合
- **分子拡散**・・・ミクロスケール(分子レベル)での混合

拡散・混合過程・・・**乱流拡散** + **分子拡散**

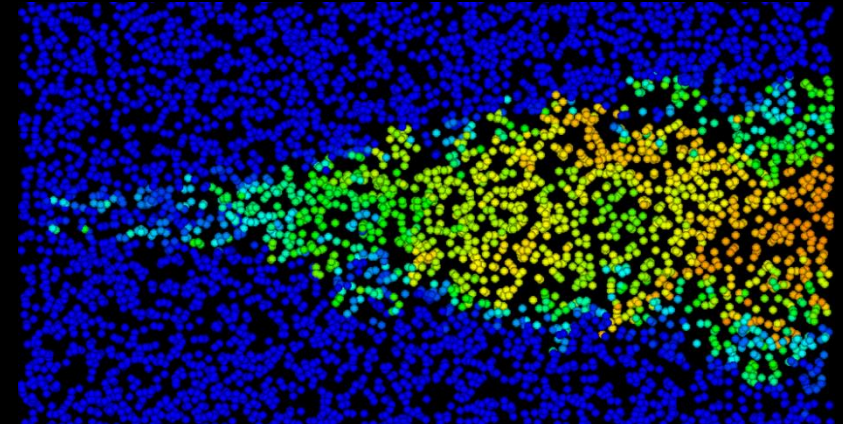
乱流中の化学反応過程で重要

分子拡散に対して混合モデルを用いた**反応場のラグランジュ的数値計算手法**の開発^[1,2]

Concentration of chemical product in a reactive jet



Direct numerical simulation



Lagrangian particle simulations with the mixing volume model^[1]

[1] Watanabe et al., "LES-Lagrangian particle method for turbulent reactive flows based on the approximate deconvolution model and mixing model," J. Comput. Phys, 2015.

[2] T. Watanabe and K. Nagata, "LES-Lagrangian-particles-simulation of turbulent reactive flows at high Sc number using approximate deconvolution model," AIChE J., 2016

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