



HAL
open science

Convoluted interfaces in laminar dispersing jets

Juan Valdes, Fuyue Liang, Lyes Kahouadji, Seungwon Shin, Jalel Chergui,
Damir Juric, Omar Matar

► **To cite this version:**

Juan Valdes, Fuyue Liang, Lyes Kahouadji, Seungwon Shin, Jalel Chergui, et al.. Convoluted interfaces in laminar dispersing jets. 75th Annual Meeting of the APS Division of Fluid Dynamics, Nov 2022, Indianapolis, United States. American Physical Society, 10.1103/APS.DFD.2022.GFM.P0023 . hal-04401585

HAL Id: hal-04401585

<https://hal.science/hal-04401585>

Submitted on 17 Jan 2024

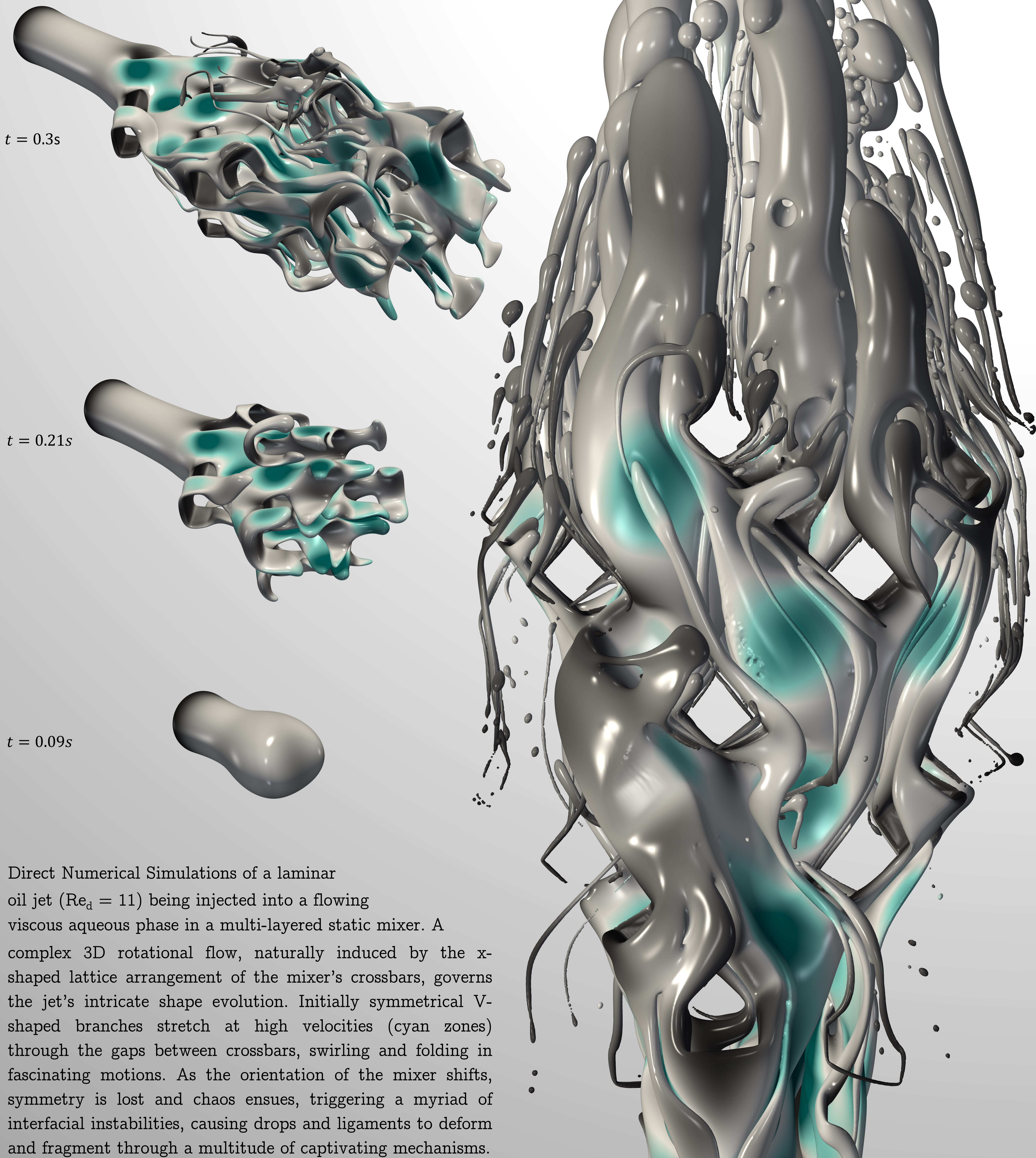
HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Convolututed interfaces in laminar dispersing jets

J. P. Valdes*, F. Liang*, L. Kahouadji*, S. Shin[†], J. Chergui[‡],
D. Juric^{‡◊}, O. K. Matar*

*Imperial College London, [†]Hongik University, [‡]LISN-CNRS,
[◊]University of Cambridge



Direct Numerical Simulations of a laminar oil jet ($Re_d = 11$) being injected into a flowing viscous aqueous phase in a multi-layered static mixer. A complex 3D rotational flow, naturally induced by the x-shaped lattice arrangement of the mixer's crossbars, governs the jet's intricate shape evolution. Initially symmetrical V-shaped branches stretch at high velocities (cyan zones) through the gaps between crossbars, swirling and folding in fascinating motions. As the orientation of the mixer shifts, symmetry is lost and chaos ensues, triggering a myriad of interfacial instabilities, causing drops and ligaments to deform and fragment through a multitude of captivating mechanisms.