

ATOMIZATION AND SPRAYS

CONTENTS, VOLUME 28, 2018

Page Range of Issues – 1: 1–89; Issue 2: 91–193; Issue 3: 195–297; Issue 4: 299–388;
Issue 5: 389–480; Issue 6: 481–579; Issue 7: 581–672; Issue 8: 673–762; Issue 9: 763–856;
Issue 10: 857–955; Issue 11: 957–1059; Issue 12: 1061–1160

ISSUE 1

Dynamics of Near-Field and Far-Field Spray Formed by Liquid Jet in Oscillating Crossflow <i>A. Sharma & J.G. Lee</i>	1
End of Injection Process in a Single-Hole Diesel Injector <i>M. Ghiji, L. Goldsworthy, P.A. Brandner, V. Garaniya, & P. Hield</i>	23
High-Speed Radiography and Visible Light Extinction of a Pressure-Swirl Atomizer <i>A.L. Kastengren</i>	47
From High-Fidelity Numerical Simulations of a Liquid-Film Atomization to a Regime Classification <i>C. Bilger & R.S. Cant</i>	65

ISSUE 2

Penetration of Aerated Suspension Spray in a Gaseous Crossflow <i>A. Saleh, G. Amini, & A. Dolatabadi</i>	91
Flash-Boiling Initialization for Spray Simulations based on Parametric Studies <i>S.K. Rachakonda, Y. Wang, & D.P. Schmidt</i>	111
Finite Particle Methods for Computing Interfacial Curvature in Volume of Fluid Simulations <i>E.A. Wenzel & S.C. Garrick</i>	141
Effect of Flow Rate and Electric Field on Electrospray Diffusion Flame of Ethanol and Butanol <i>S. Jowkar, M.R. Morad, & S. Ghorbani</i>	161
Large Eddy Simulation of Polydisperse Particle Deposition in an Idealized Mouth-Throat <i>X.G. Cui, E.M. Littringer, N.A. Urbanetz, & E. Gutheil</i>	179

ISSUE 3

Model of the Fuel Jet Primary Atomization and Aerodynamics of Spray Formation at High-Pressure Injection in a Diesel Engine <i>O.G. Girin</i>	195
Characteristics of Free Spray Development, Mixture Formation, and Combustion under High-Pressure Split Injection <i>K. Yang, H. Yamakawa, K. Nishida, & Y. Ogata</i>	217
Determination of the Drop Size during Atomization of Liquid Jets in Cross Flows <i>T.-W. Lee, J.E. Park, & R. Kurose</i>	241
Application of the Infrared Extinction to a Swirled Air/Ethanol Spray Downstream from a Turbojet Injection System <i>V. Bodoc & O. Rouzaud</i>	255
Effect of Coandă-Deflection-Openings on the Spray Behavior of Pressure Swirl Nozzles <i>J. Kamplade, I. Hohlfeld, M. Kelz, M. Thommes, & P. Walzel</i>	281

ISSUE 4

Experimental Study of Spray Breakup Phenomena in Small-Scale Simplex Atomizers with and without Air Swirl	299
<i>G. Muthuselvan, K.D. Ghate, M.S. Rao, V.S. Iyengar, S. Thirumalachari, & S. Kothandaraman</i>	
Computational Study of Atomization and Fuel Drop Size Distributions in High-Speed Primary Breakup	321
<i>L. Bravo, D. Kim, F. Ham, & S. Su</i>	
Water Distribution Characteristics of Diaphragm-Type Pressure Atomizer for Watering and Irrigation	345
<i>M. Ochowiak, T. Szulc, S. Włodarczak, M. Matuszak, W. Makać, A. Gościniak, & M. Doligalski</i>	
Numerical Investigation of Flame Propagation in Fuel Droplet Arrays	357
<i>Y. Haruki, A.L. Pillai, T. Kitano, & R. Kurose</i>	

ISSUE 5

Influences of Bounded and Compressible Gas Medium on the Instability of an Annular Power-Law Liquid Jet	389
<i>Y.-B. Wang, J.-P. Guo, F.-Q. Bai, & Q. Du</i>	
Atomization of High-Viscosity and Non-Newtonian Fluids by Premixing	403
<i>T. Baker, M. Negri, & V. Bertola</i>	
Numerical Investigation of Multiphase Flow inside a Pressure Swirl Atomizer at the Initial Stage of Injection	417
<i>A. Razeghi & Ö. Ertunç</i>	
Lagrangian Approach to Axisymmetric Spray Simulation of Pintle Injector for Liquid Rocket Engines	443
<i>K. Radhakrishnan, M. Son, K. Lee, & J. Koo</i>	
Correlations for Evaporation History of Fuel Droplets Released into a High-Pressure Nitrogen Cross-Flow Premixer	459
<i>A. Kazemi Fard & H. Khaleghi</i>	

ISSUE 6

Predicting the Performance of Pressure-Swirl Atomizers	481
<i>O.E. Nural & Ö. Ertunç</i>	
Visualization Investigations of Flow Regimes in Different Sizes of Diesel Injector Nozzles and Their Effects on Spray	547
<i>G. Guo, Z. He, Y. Jin, Z. Chen, X. Duan, & X. Leng</i>	
Ultrashort Pulse Off-Axis Digital Holography for Imaging the Core Structure of Transient Sprays	565
<i>M. Minniti, A. Ziaeef, J. Trolinger, & D. Dunn-Rankin</i>	

ISSUE 7

Droplet Shadow Velocimetry based on Monoframe Technique	581
<i>A. Kebriaee, M.J. Akbari, & F. Abbasi Zarrin</i>	
Critical Evaluation of Momentum Flux Ratio Relative to a Liquid Jet in Crossflow	599
<i>S.B. Leask, V.G. McDonell, & S. Samuelsen</i>	

Three-Dimensional Simulations of Drop Deformation and Breakup in Air Flow and Comparisons with Experimental Observations	621
<i>C. Liang, K.A. Feigl, F.X. Tanner, W.R. Case, & E.J. Windhab</i>	
Pulsating Slurry Atomization, Film Thickness, and Azimuthal Instabilities	643
<i>W. Strasser & F. Battaglia</i>	

ISSUE 8

Modeling Kinetic Energy Dissipation of Bouncing Droplets for Lagrangian Simulation of Impinging Sprays under High Ambient Pressures	673
<i>Z. Zhang & P. Zhang</i>	
Numerical Investigation on Effects of Elliptical Diesel Nozzle on Primary Spray Characteristics by Large Eddy Simulation (LES)	695
<i>S. Yu, B. Yin, W. Deng, H. Jia, Z. Ye, B. Xu, & H. Xu</i>	
Experimental and Numerical Study of Internal Flow and Spray Characteristics for Elliptical Orifice under Typical Diesel Engine Operation Conditions	713
<i>S. Yu, B. Yin, W. Deng, H. Jia, Z. Ye, B. Xu, & H. Xu</i>	
Flow Fields and Turbulent Characteristics in Non-Evaporating Diesel Sprays	735
<i>Y. Kobashi, K. Yokogawa, H. Miyabe, R. Hase, & S. Kato</i>	
Fishbone Pattern Formation Due to Asymmetries in Colliding Low-Velocity Jets	751
<i>A. Kebriaee, S. Kashanji, & Gh. Olyaei</i>	

ISSUE 9

Effects of Flow Pattern on the Breakup Length of Circular Air-Assisted Water Jets	763
<i>D. Trainer</i>	
Macroscopic and Microscopic Characteristics of Gasoline and Butanol Spray Atomization under Elevated Ambient Pressures	779
<i>Y. Li, H. Guo, Y. Shen, X. Ma, L. Chen, & L. Feng</i>	
A Comparison of Evaporating Spray Structure of Jatropha Methyl Ester and Diesel, and Surrogate Fuels	797
<i>P. Boggavarapu & R.V. Ravikrishna</i>	
Global Characterization of the Spray Formation Process	811
<i>M.F. Trujillo, S. Gurjar, M. Mason, & A. Agarwal</i>	
Interplume Velocity and Extinction Imaging Measurements to Understand Spray Collapse when Varying Injection Duration or Number of Injections	837
<i>P. Sphicas, L.M. Pickett, S.A. Skeen, J.H. Frank, & S. Parrish</i>	

ISSUE 10

Development of a Spread Submodel for Spray/Wall Impaction	857
<i>H. Khaleghi, S. Yazdanparast, M. Keshtkar, & Z. Firouznia</i>	
Proper Orthogonal Decomposition Analysis of Turbulent Cryogenic Liquid Jet Injection under Transcritical and Supercritical Conditions	875
<i>S. Taghizadeh & D. Jarrahbashi</i>	
Experimental Investigation on Near-Field Breakup Characteristics of Hybrid-Mixed Twin-Fluid Atomizer	901
<i>S.Y. Li, X.Y. Yang, C. Fu, T.Y. Li, & Y. Gao</i>	
Experimental Study of the Morphology of Two-Phase Flame Instabilities in Microgravity	915
<i>G. Renoux, F. Halter, & C. Chauveau</i>	

Large Eddy Simulations of Cavitating Flow in a Step Nozzle with Injection into Gas	931
<i>T. Trummler, D. Rahn, S.J. Schmidt, & N.A. Adams</i>	

ISSUE 11

Computational Analysis of Flow Patterns in Elliptical Diesel Nozzles at High Injection Pressures	957
<i>S. Yu, B. Yin, W. Deng, H. Jia, Z. Ye, B. Xiu, & H. Xu</i>	
Effect of Mach Number on Liquid Jet Primary Breakup in Gas Crossflow	975
<i>F. Xiao & M.B. Sun</i>	
Insight into the Dynamics of Internal and External Flow Fields of the Pressure Swirl Nozzle	1001
<i>F. Vashahi & J.K. Lee</i>	
X-Ray Imaging Techniques to Quantify Spray Characteristics in the Near Field	1029
<i>T.J. Heindel</i>	

ISSUE 12

Primary Atomization Instability Extraction Using Dynamic Mode Decomposition	1061
<i>W. Krolick & M. Owkes</i>	
Numerical Investigation of the Primary Breakup Region of High-Pressure Sprays	1081
<i>J. Manin</i>	
Numerical Simulation of Evaporation and Deformation of a Single n-Heptane Droplet under Forced Convective Condition	1101
<i>Z.-C. Jin, Z.-Y. Wang, C. Sun, & F.-X. Sun</i>	
Atomization and Breakup of Liquid Kerosene at Elevated Pressure	1123
<i>C. Bilger & S. Cant</i>	
Effect of High Injection Pressures and Ambient Gas Properties over the Macroscopic Characteristics of the Diesel Spray on Multi-Hole Nozzles	1145
<i>J.S. Giraldo, R. Payri, P. Martí-Aldaraví, & T. Montiel</i>	
Index, Volume 28, 2019	1161

ATOMIZATION AND SPRAYS

AUTHOR INDEX, VOLUME 28, 2018

Page Range of Issues – 1: 1–89; Issue 2: 91–193; Issue 3: 195–297; Issue 4: 299–388;
Issue 5: 389–480; Issue 6: 481–579; Issue 7: 581–672; Issue 8: 673–762; Issue 9: 763–856;
Issue 10: 857–955; Issue 11: 957–1059; Issue 12: 1061–1160

- | | | |
|-------------------------|------------------------|--------------------------|
| Abbasi Zarrin, F., 581 | Guo, H., 779 | Littringer, E.M., 179 |
| Adams, N.A., 931 | Guo, J.-P., 389 | Ma, X., 779 |
| Agarwal, A., 811 | Gurjar, S., 811 | Makać, W., 345 |
| Akbari, M.J., 581 | Gutheil, E., 179 | Manin, J., 1081 |
| Amini, G., 91 | Halter, F., 915 | Martí-Aldaraví, P., 1145 |
| Bai, F.-Q., 389 | Ham, F., 321 | Mason, M., 811 |
| Baker, T., 403 | Haruki, Y., 357 | Matuszak, M., 345 |
| Battaglia, F., 643 | Hase, R., 735 | McDonell, V.G., 599 |
| Bertola, V., 403 | He, Z., 547 | Minniti, M., 565 |
| Bilger, C., 65, 1123 | Heindel, T.J., 1029 | Miyabe, H., 735 |
| Bodoc, V., 255 | Hield, P., 23 | Montiel, T., 1145 |
| Boggavarapu, P., 797 | Hohlfeld, I., 281 | Morad, M.R., 161 |
| Brandner, P.A., 23 | Iyengar, V.S., 299 | Muthuselvan, G., 299 |
| Bravo, L., 321 | Jarrahbashi, D., 875 | Negri, M., 403 |
| Cant, R.S., 65 | Jia, H., 695, 713, 957 | Nishida, K., 217 |
| Cant, S., 1123 | Jin, Y., 547 | Nural, O.E., 481 |
| Case, W.R., 621 | Jin, Z.-C., 1101 | Ochowiak, M., 345 |
| Chauveau, C., 915 | Jowkar, S., 161 | Ogata, Y., 217 |
| Chen, L., 779 | Kamplade, J., 281 | Olyaei, Gh., 751 |
| Chen, Z., 547 | Kashanj, S., 751 | Owkes, M., 1061 |
| Cui, X.G., 179 | Kastengren, A.L., 47 | Park, J.E., 241 |
| Deng, W., 695, 713, 957 | Kato, S., 735 | Parrish, S., 837 |
| Dolatabadi, A., 91 | Kazemi Fard, A., 459 | Payri, R., 1145 |
| Doligalski, M., 345 | Kebriaee, A., 581, 751 | Pickett, L.M., 837 |
| Du, Q., 389 | Kelz, M., 281 | Pillai, A.L., 357 |
| Duan, X., 547 | Keshtkar, M., 857 | Rachakonda, S.K., 111 |
| Dunn-Rankin, D., 565 | Khaleghi, H., 459, 857 | Radhakrishnan, K., 443 |
| Ertunç, Ö., 417, 481 | Kim, D., 321 | Rahn, D., 931 |
| Feigl, K.A., 621 | Kitano, T., 357 | Rao, M.S., 299 |
| Feng, L., 779 | Kobashi, Y., 735 | Ravikrishna, R.V., 797 |
| Firouznia, Z., 857 | Koo, J., 443 | Razeghi, A., 417 |
| Frank, J.H., 837 | Kothandaraman, S., 299 | Renoux, G., 915 |
| Fu, C., 901 | Krolick, W., 1061 | Rouzaud, O., 255 |
| Gao, Y., 901 | Kurose, R., 241, 357 | Saleh, A., 91 |
| Garaniya, V., 23 | Leask, S.B., 599 | Samuelson, S., 599 |
| Garrick, S.C., 141 | Lee, J.G., 1 | Schmidt, D.P., 111 |
| Ghate, K.D., 299 | Lee, J.K., 1001 | Schmidt, S.J., 931 |
| Ghiji, M., 23 | Lee, K., 443 | Sharma, A., 1 |
| Ghorbani, S., 161 | Lee, T.-W., 241 | Shen, Y., 779 |
| Giraldo, J.S., 1145 | Leng, X., 547 | Skeen, S.A., 837 |
| Girin, O.G., 195 | Li, S.Y., 901 | Son, M., 443 |
| Goldsworthy, L., 23 | Li, T.Y., 901 | Sphicas, P., 837 |
| Gościniak, A., 345 | Li, Y., 779 | Strasser, W., 643 |
| Guo, G., 547 | Liang, C., 621 | Su, S., 321 |

- Sun, C., 1101
Sun, F.-X., 1101
Sun, M.B., 975
Szulc, T., 345
Taghizadeh, S., 875
Tanner, F.X., 621
Thirumalachari, S., 299
Thommes, M., 281
Trainer, D., 763
Trolinger, J., 565
Trujillo, M.F., 811
Trummler, T., 931
- Urbanetz, N.A., 179
Vashahi, F., 1001
Walzel, P., 281
Wang, Y., 111
Wang, Y.-B., 389
Wang, Z.-Y., 1101
Wenzel, E.A., 141
Windhab, E.J., 621
Włodarczak, S., 345
Xiao, F., 975
Xiu, B., 957
Xu, B., 695, 713
- Xu, H., 695, 713, 957
Yamakawa, H., 217
Yang, K., 217
Yang, X.Y., 901
Yazdanparast, S., 857
Ye, Z., 695, 713, 957
Yin, B., 695, 713, 957
Yokogawa, K., 735
Yu, S., 695, 713, 957
Zhang, P., 673
Zhang, Z., 673
Ziae, A., 565

ATOMIZATION AND SPRAYS

SUBJECT INDEX, VOLUME 28, 2018

**Page Range of Issues – 1: 1–89; Issue 2: 91–193; Issue 3: 195–297; Issue 4: 299–388;
Issue 5: 389–480; Issue 6: 481–579; Issue 7: 581–672; Issue 8: 673–762; Issue 9: 763–856;
Issue 10: 857–955; Issue 11: 957–1059; Issue 12: 1061–1160**

- Abel deconvolution, 255
acoustics, 643
aerated, 91
aerosol flame, 915
aerosols, 241
air ingestion, 23
air suction, 547
airblast, 65, 1123
annular liquid jets, 389
atomization device, 403
atomization simulation, 141
atomization, 241, 345, 417, 779
atomizing jet, 1061
axis-switching, 695
bag breakup, 621
biodiesel, 797
breakup, 811, 901
butanol, 161
cavitating nozzle flows, 931
cavitation shedding, 547
cavitation, 713, 957
cellular instabilities, 915
cellular wavelength, 915
CFD, 417
Coanda effect, 281
co-current downward two-phase flow, 763
coherence gating, 565
collapse dynamics, 931
collapse, 837
colliding jets, 751
combustion dynamics, 1
combustion, 217
compressible flow, 643
compressible gas medium, 389
condition, 111
conservative level set, 65
correlation, 459
cost-effective velocimetry, 581
crossflow, 91, 241, 459
curvature, 141
DBI, 837
deformation, 1101
deposition efficiency, 179
diaphragm, 345
diesel engine, 957
diesel injection, 1145
diesel nozzle, 695, 713
diesel spray, 23, 735, 1081
diesel, 547
diffusion flame, 161
digital holography, 565
direct numeric simulation, 1061
discharge coefficient, 957
DNS, 1081
drop breakup, 621
drop deformation, 621
drop size, 1081
droplet breakaway mechanics, 195
droplet collision, 673
droplet recognition, 1123
droplet size histogram, 345
droplet size, 459
droplet sizing, 599
droplet, 1101
effervescent, 91
electrospray, 161
elliptical nozzle, 957
elliptical orifice, 713
elliptical, 695
end of injection, 23
error analysis, 481
ethanol, 161
Eulerian–Lagrangian, 459
evaporating spray aerodynamics, 195
evaporating sprays, 797
evaporation history, 459
evaporation, 1101
experimental data, 481
external flow, 1001
finite particle method, 141
fishbone pattern, 751
flame morphology, 915
flame propagation, 357
flash-boiling, 111
flow pattern, 763
Fourier optics, 565
free spray, 217
frequency analysis, 931
front tracking method, 673
fuel droplet arrays, 357
fuels, 321
gas crossflow, 975
gas entrainment, 931
gasoline direct injection, 111, 779
high pressure, 673
high-speed imaging, 901
high-viscosity fluids, 403
homogenous relaxation model (HRM), 111
hybrid mixing, 901
idealized mouth-throat, 179
impinging sprays, 673
incompressible flow, 65
infrared extinction, 255
injection duration, 837
injection velocity, 599
injector, 417
in-nozzle flow, 23
instability and breakup, 389
integral length scale, 735
interaction cavitation mass flow, 931
interface tracking, 975
interfacial area, 811
inter-Foam, 811
internal flow, 1001
interphase momentum, 811
Jatropha methyl ester, 797
jet atomization, 195
jet breakup modeling, 1061
jet breakup, 763
jet in crossflow, 599
jet penetration, 599

kinetic energy dissipation, 673
Lagrangian approach, 443
large eddy simulation, 695, 713, 875, 1001
LAS, 217
LED pulsed light illumination, 581
LES, 179
level-set, 357
liquid film, 65, 1123
liquid jet in crossflow, 1
liquid jet, 975
liquid sheet instability, 751
Mach number, 975, 1145
mathematical modeling, 195
microscopic, 901
MIE scattering, 1145
momentum flux ratio, 599
multiphase flow, 1123
multiphase flow, 65
multiphase, 417
multiple injections, 837
multiple scattering, 565
n-butanol, 779
n-dodecane, 797
near field, 901
near-field measurements, 1029
near-field spray, 811
new model, 857
n-heptane fuel, 459
n-hexadecane, 797
numerical simulation, 195, 255, 357
OpenFOAM®, 621
oscillating crossflow, 1
particle shadow velocimetry, 581
particle/droplet analysis, 901
penetration height, 91
pintle injector, 443
PIV, 735, 837
polydisperse particle deposition, 179
power-law fluids, 389
prefilming, 643
premix tube, 459
pressure atomizer, 345
pressure swirl nozzle, 281, 1001
pressure swirl, 47, 417
pressure-swirl atomizer, 481
primary atomization, 23, 65, 111, 321, 1123
primary breakup, 299, 975
primary jet breakup, 931
product drop distributions, 621
proper orthogonal decomposition, 875, 1001, 1061
PSI-cell, 357
RCLS method, 65, 1123
rebound, 857
reduced-order modeling, 1061
robust conservative level-set, 1123
Sauter mean diameter, 345
scale effects, 547
SEA method, 621
secondary breakup, 299
semiempirical correlation, 481
sheet attachment, 281
sheet-thinning breakup, 621
shock waves, 1145
signal processing, 565
simplex atomizer, 299
simulation, 443
single frame velocimetry, 581
SMD, 241
soot, 217
speed of sound, 1145
splash, 857
split injection, 217
spray breakup, 1081
spray characteristic, 713
spray diagnostics, 565
spray formation, 195
spray generator, 403
spray imaging, 1029
spray hysteresis, 299
spray initialization
spray mixture formation, 217
spray nozzle, 281
spray penetration, 1145
spray, 547, 779, 837, 1061
spray/wall impaction, 857
spraying technology, 281
spread, 857
stamen breakup, 621
stick, 857
stripping breakup, 621
supercritical injection, 875
surface mount device, 901
surrogate fuels, 797
suspensions, 91
synchrotron X-rays, 1029
Tikhonov regularization, 255
time-resolved, 47
tracking algorithm, 1123
transcritical, 875
tube-source X-rays, 1029
turbid media imaging, 565
turbojet injection system, 255
turbulence intensity, 735
turbulent coherent structures, 875
turbulent mixing, 735
turbulent vortex, 957
twin-fluid atomizer, 901
two-phase combustion, 915
two-phase jet, 763
ultrafast lasers, 565
unsteady flow field, 1001
validation, 443
vapor concentration, 255
viscoplastic gel, 403
visualization, 321, 547
VOF method, 1101
VOF, 417, 643
volume of fluid, 141, 321
vortex-core tracking, 1001
wave model, 443
x-ray diagnostics, 1029
x-ray radiography, 47
x-ray scattering, 47