

Publications

Thesis

- [1] M. Klein. *Towards LES as an Engineering Tool*, Habilitation, Technische Universität Darmstadt. 2009.
- [2] M. Klein. *Direkte Numerische Simulation des primären Strahlzerfalls in Einstoffzerstäuberdüsen*. PhD thesis, Technische Universität Darmstadt, 2002.

Journal Articles

- [3] U. Ahmed, N. Chakraborty, and M. Klein. Assessment of Bray Moss Libby formulation for premixed flame-wall interaction within turbulent boundary layers: Influence of flow configuration. *Combustion and Flame*, 2021, accepted.
- [4] A.R. Varma, U. Ahmed, N. Chakraborty, and M. Klein. Effects of turbulent length scale on the bending effect of turbulent burning velocity in premixed turbulent combustion. *Combustion and Flame*, 2021, accepted.
- [5] R. Rasool, N. Chakraborty, and M. Klein. Effect of non-ambient pressure conditions and Lewis number variation on direct numerical simulation of turbulent Bunsen flames at low turbulence intensity combustion and flame. *Combustion and Flame*, 2021, accepted.
- [6] E. Trautner, M. Klein, F. Braeuer, and J. Hasslberger. Conditional and unconditional second-order structure functions in bubbly channel flows of power-law fluids. *Physics of Fluids*, 2021, accepted.
- [7] P.J. Wenig, R. Ji, S. Kelm, and M. Klein. Towards uncertainty quantification of LES and URANS for the buoyancy-driven mixing process between two miscible fluids - differentially heated cavity of aspect ratio 4. *Fluids*, 2021, accepted.
- [8] M. Bambauer, N. Chakraborty, M. Klein, and J. Hasslberger. Vortex dynamics and fractal structures in reactive and nonreactive Richtmyer-Meshkov instability. *Physics of Fluids*, 2021, accepted.
- [9] J. Hasslberger, G. Ozel-Erol, N. Chakraborty, M. Klein, and S. Cant. Physical effects of water droplets interacting with turbulent premixed flames: A direct numerical simulation analysis. *Combustion and Flame*, 229:111404, 2021.
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- [12] J. Hasslberger, L. Engelmann, A. Kempf, and M. Klein. Robust dynamic adaptation of the Smagorinsky model based on a sub-grid activity sensor. *Physics of Fluids*, 33:015117, 2021.
- [13] F. Braeuer, E. Trautner, J. Hasslberger, P. Cifani, and M. Klein. Turbulent bubble-laden channel flow of power-law fluids: A direct numerical simulation study. *Fluids*, 6(1):40, 2021.

- [14] C. Kasten, U. Ahmed, M. Klein, and N. Chakraborty. Principal strain rate evolution within turbulent premixed flames for different combustion regimes. *Physics of Fluids*, 33:015111, 2021.
- [15] M. Pfitzner and M. Klein. A near-exact analytic solution of progress variable and pdf for single-step Arrhenius chemistry. *Combustion and Flame*, 226:380–395, 2020.
- [16] M. Reissmann, J. Hasslberger, R.D. Sandberg, and M. Klein. Application of gene expression programming to a-posteriori LES modeling of a Taylor Green vortex. *Journal of Computational Physics*, 424:109859, 2021.
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- [18] S. Yigit, J. Hasslberger, M. Klein, and N. Chakraborty. Near wall Prandtl number effects on velocity gradient invariants and flow topologies in turbulent Rayleigh-Benard convection. *Scientific Reports*, 10:14887, 2020.
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Book Chapters

- [116] K. Rajkumar, E. Tangermann, M. Klein, S. Ketterl, and A. Winkler. *DES of weapon bay in fighter aircraft under high subsonic and supersonic conditions*. Springer International Publishing, Cham, 2021.
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Invited Talks

- [266] M. Klein. Towards LES of primary atomization. In *International Workshop on Clean Combustion: Principles and Applications*, Darmstadt, September 2019.
- [267] M. Klein. Towards LES of multiphase flows with moving interfaces. University of Groningen, July 2019.
- [268] M. Klein. Towards LES of multiphase flows with moving interfaces. Darmstadt, May 2019.
- [269] M. Klein. Towards LES of multiphase flows with moving interfaces. In *16th Multiphase Flow Conference and Short Course*, Dresden, November 2018.
- [270] M. Klein. Mathematische und physikalische Modellierung von turbulenten Zweiphasenströmungen. ITLR, University Stuttgart, March 2018.
- [271] M. Klein. Towards LES for two phase flows. Helmholtz-Zentrum Dresden-Rossendorf, July 2017.
- [272] M. Klein. Recent experiences with modelling of turbulence chemistry interaction in the context of LES using DNS of turbulent premixed generic planar flame configurations. Annual meeting of the UK Consortium on Turbulent Reacting Flows, September 2016.
- [273] M. Klein. Analysis of the combined modelling of subgrid transport and filtered flame propagation for premixed turbulent combustion. University of Duisburg, January 2015.
- [274] M. Klein. An attempt to assess the quality of les in the context of implicit filtering. University of Newcastle, November 2013.
- [275] M. Klein. Industrial CFD: Applications and challenges. Technical University of Munich, February 2013.
- [276] M. Klein. 3D CFD base engine development. University of Applied Science, Darmstadt, December 2010.
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- [278] M. Klein. 3D CFD base engine development. University of Applied Science, Darmstadt, January 2008.
- [279] M. Klein. LES quality assessment. In *8th Workshop on Turbulent Nonpremixed Flames*, Heidelberg, August 2006.
- [280] M. Klein. Quality assessment of LES in the context of implicit filtering. In *Quality Assessment of Unsteady Methods for Turbulent Combustion Prediction and Validation*, Darmstadt, June 2005.
- [281] M. Klein. Numerical and experimental characterization of the turbulence structure in swirled flows. Cambridge University, November 2004.
- [282] M. Klein. How LES can be made an engineering tool. Cambridge University, July 2004.
- [283] M. Klein. Direkte numerische Simulation von ebenen ein- und zweiphasigen Freistrahlen. University of Zurich, Mai 2003.
- [284] M. Klein. On the artificial generation of inlet and initial data for unsteady turbulent flow simulation. In *17. TECFLAM-Seminar*, Stuttgart, Dezember 2003.