Fan E

Email: e.fan@connect.polyu.hk
Contact: (+86)13261531936

Researches：

Fluid Mechanics, Combustion, Computational Fluid Dynamics (CFD), Finite Volume Methods (FVM).

- Compressible aerodynamics, Compressible multi-phase flow, Deflagration-to-Detonation Transition (DDT), Richtmyer-Meshkov instability, shock-flame interaction, gaseous combustion, detailed chemical mechanisms.
- Incompressible fluid dynamics, Conjugated Heat Transfer, automotive aerodynamics, electronic thermal management.
- High-Performing Computation (HPC), Adaptive Mesh Refinement (AMR), Space Filling Curve (SFC), dynamic load balancing.

Educations：

2009-09 – 2013-07	Xi'an Jiaotong University	Energy & Power Engineering	Bachelor of Engineering
2014-09 – 2017-07	Institute of Mechanics, Chinese Academy of Science	Fluid Mechanics	Master of Engineering
2017-09 – 2021-11	Hong Kong Polytechnic University	Mechanical Engineering	Ph.D. of Engineering

Working Experiences：

2021-11 – 2022-01	Hong Kong Polytechnic University	Research Assistant
2022-01 – Now	Shenzhen SimArk Technology	Senior R&D Engineer

Experiences of CFD simulation and solver development:

2015.9 - 2017.7(Master study) studied the supersonic combustion using OpenFOAM.

2017.9- 2018.12 (PhD first year) developed a multi-component combustion solver using CE/SE method with C.

2019.1 – 2019.9 developed a compressible combustion solver on the in-house code PHAROS with FORTRAN, then rewritten the solver with C++.

2019.9 – 2020.3, for detonation study, tried different opensource AMR frameworks, including Uintah, SAMRAI.

2020.3 – 2020.6, developed the combustion solver Fire on an open-source AMR framework ECOGEN.

2020.6 – 2022.3, kept improving the Fire solver and apply it on my PhD work: shock-focusing ignition and shock-flame interaction.

2022.3 – Now, working on an incompressible FVM solver based on the PHengLEI project aiming for thermal management and automotive aerodynamics.

- Proficient in CFD development with Fortran, C, and C++.
- From 2015, developed parallel codes using MPI and worked on supercomputers for HPC.

Publications:

E. Fan, Jiaao Hao, Ben Guan, Chih-yung Wen, Lisong Shi. (2022). *Numerical investigation on reacting shock-bubble interaction at a low Mach limit*. Combustion and Flame. Volume 241, 112085

Guan, B., Wang, D., Wang, G., **Fan, E**., & Wen, C. Y. (2020). Numerical study of the Richtmyer–Meshkov instability of a three-dimensional minimum-surface featured SF6/air interface. Physics of Fluids, 32(2), 024108.

Fan, E., Guan, B., Wen, C. Y., & Shen, H. (2019). *Numerical study on the jet formation of simple-geometry heavy gas inhomogeneities*. Physics of Fluids, 31(2), 026103.

Li, X., **Fan, E**., Yao, W., & Fan, X. (2017). *Numerical investigation of characteristic frequency excited highly underexpanded jets*. Aerospace Science and Technology, 63, 304-316.

Conferences:

E Fan. Current progress on shock-bubble interaction and shock-droplet interaction, Nov 8-10, 2021, Webinar, TUM-PolyU Joint Workshop on Aviation Engineering.

E Fan, Jiaao Hao, Ben Guan and Chih-Yung Wen. Numerical Study on the Ignition and Combustion Wave Propagation of the Reactive Shock-Bubble Interactions, 2019, Singapore, Proceedings of the 32nd International Symposium on Shock Waves (ISSW32)

Fan, E., Wu, K., Lee, Y., Yao, W., & Fan, X. (2018). *Full-scale Improved Delayed Detached Eddy Simulation of Transverse Hydrogen Jet in Supersonic Combustion*. In 2018 Joint Propulsion Conference (p. 4542).

E Fan, Jiaao Hao, Ben Guan and Chih-Yung Wen. *Influence of Combustion on the Shock Pattern and Interface Evolution in Shock Wave-Heavy Bubble Interaction*. The 8th East Asia MAE workshop. Dec,2018, Hong Kong, PRC

In preparation:

Extension and validation of a novel AMR frameworks ECOGEN to compressible combustion applications