PERSONAL INFORMATION

Weipeng YAO

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SUMMARY

Over 10 years of international research experience in magnetized laboratory astrophysics and plasma instabilities, as well as laser-plasma science and magnetized laser-plasma interactions related to inertial confinement fusion. Strong expertise in both advanced computational modeling (PIC + MHD), and also hands-on laboratory experience in large-scale laser facilities. Very good at collaboration, communication, and writing (scientific papers, funding and beamtime proposals).

WORK

2019 – Now

Laboratoire pour l'Utilisation des Lasers Intenses (LULI), École Polytechnique, Centre national de la recherche scientifique (CNRS), France

Post-doc Researcher

Advisor: Julien Fuchs (LULI) & Andrea Ciardi (LERMA)

– use and development of kinetic PIC codes, i.e., **SMILEI** and **EPOCH**, and extended MHD codes **GORGON** and **FLASH**;

– add a PIC module in GORGON to investigate the micro-physics of **laser-driven particle-turbulence interaction**;

– hands-on laboratory experience at large-scale high-power laser facilities worldwide, i.e., **SG-II-U** (CH), **Apollon** (FR) and **Vulcan** (UK).

EDUCATION

2015 – 2019 Ph. D.: Plasma Physics, Peking University, Beijing, China (**TOP 2**)

Thesis Kinetic study of relativistic jet and plasmas interaction in high energy astrophysics

2012 – 2015 Master of Science: Plasma Physics, China Academy of Engineering Physics, Beijing, China

Thesis Particle simulation research on monochromatic proton acceleration via ultra-short ultra-intense laser pulse and multi-component plasma interaction

NUMERICAL MODELING

Development

2019 – Now Particle injection and collision in Particle-in-cell (PIC) code **SMILEI**, written in C++

2019 – Now PIC module and Biermann-battery fields in resistive magneto-hydrodynamic (MHD) code **GORGON**, written in Fortran

2023 – Now Collision in Hybrid-PIC code with adaptive mesh refinement **PHARE**, written in C++

2012 – 2019 Particle merge in PIC code **EPOCH**, written in Fortran

Routinely use

2022 – Now Retrive path-integrated magnetic fields from proton radiography using the reconstruction algorithm **PROBLEM**, written in Matlab and Python

2020 – Now Retrive electron temperature using Monte Carlo simulation package **FLUKA**, written in Fortran

2019 – Now Get pre-plasma expansion using radiation hydrodynamic code **MULTI**, written in C++

LASER EXPERIMENTS

May 2019	Laboratory observation of magnetic reconnection in collisional-collisionless regime at **SG-II-U**
May 2021	First commissioning phase of the short-focal-length area of the **Apollon** laser facility at 1 PW
April 2022	Optimized production of protons driven by the **Apollon** laser facility with double plasma mirror
November 2022	Detailed characterization of the neutron emissions at the **Apollon** laser facility
April 2023	Commissioning of the main beam at the **Apollon** facility at 4 PW level
August 2023	Investigate interpenetrating magnetized collisionless super-critical shocks at **Vulcan**

DATA ANALYSIS

Computer language

Proficient in	Fortran, Python, Matlab, C++, OpenMP, MPI,
Knowledge of	Machine Learning (ML)

Visulaization software

Proficient in	Adobe illustrator, Inkscape, VisIt, ParaView

TEACHING

Teaching assistant at Sorbonne University during academic year 2023-2024

Master 1	PARIS PHYSICS MASTER - Numerical Tools in Physics
Master 2	PLASMA PHYSICS AND FUSION – Numerical Methods

REPRESENTATIVE PUBLICATIONS

For an up to date and exhaustive list of articles see my profile on google scholar

Phys. Rev. Lett. **130**, 265101 (2023) — Dynamics of nanosecond laser pulse propagation and of associated instabilities in a magnetized underdense plasma, W. Yao, et al.

J. of Plasma Phys. **89**, 915890101 (2023) — Investigating particle acceleration dynamics in interpenetrating magnetized collisionless super-critical shocks, W. Yao, et al.

Matter Radiat. at Extremes **7**, 026903 (2022) — Characterization of the stability and dynamics of a laser-produced plasma expanding across strong magnetic field, W. Yao, et al.

Nature Physics **17**, 1177–1182 (2021) — Laboratory evidence for proton energization by collisionless shock surfing W. Yao, et al.

Astrophysical J. **876**, 2 (2019) — Kinetic Particle-in-cell Simulations of the Transport of Astrophysical Relativistic Jets in Magnetized Intergalactic Medium, W. Yao, et al.

New J. Physics **20**, 053060 (2018) — The baryon loading effect on relativistic astrophysical jet transport in the interstellar medium W. Yao, et al.

Phys. Plasmas **24**, 082904(2017) — Relay transport of relativistic flows in extreme magnetic fields of stars W. Yao, et al.

INVITED SCIENTIFIC TALKS

02/2024	Matter in Extreme Conditions for Magnetized PLAsmas 2024, Montgenèvre, France

Laboratory investigation on particle energization through magnetized shocks and associated instabilities

11/2023 Réunion Plénière du GDR APPEL 2023, Saclay, France

Characterization of proton and X-ray generation at the Apollon SFA in 1-2 PW range

06/2023 6th International Conference on Matter and Radiation at Extremes (ICMRE2023), Zhuhai, China

Dynamics of nanosecond laser pulse propagation and of associated instabilities in a magnetized underdense plasma

05/2023 MRE Young Scientist Award 2023, Online

Laboratory evidence of stochastic ion acceleration in laser-driven magnetized plasma

12/2022 7th Workshop on Magnetic Fields in Laboratory High Energy Density Plasmas (LaB), Paris, France

Laboratory stochastic particle acceleration in double-jet collision via magnetic Rayleigh-Taylor instability

07/2022 48th European Conference on plasma physics (EPS2022), Online

Laboratory investigation on ion energization by the collision of magnetized collisionless shocks

05/2022 MRE Young Scientist Award 2022, Online

Nanosecond laser pulse propagation and laser-plasma instabilities in a magnetized, underdense plasma

05/2022 13th International Conference on High Energy Density Laboratory Astrophysics, Lisbon, Portugal

Laboratory evidence for proton energization by magnetized collisionless shocks

10/2021 Laser Plasma Physics Course, ELI

04/2021 International Conference on High Energy Density Sciences 2021, Osaka, Japan

Laboratory evidence for proton energization by collisionless shock surfing

HONOURS AND AWARDS

06/2019 Outstanding graduate, Peking University

09/2018 National Scholarship

12/2017 Second class of Collaborative Innovation Center of IFSA Scholarship

09/2016 Special Scholarship for PhD student, Peking University

07/2015 Outstanding graduate, Graduate School of CAEP

06/2014 Excellent Graduate Student Award, Graduate School of CAEP

2009-2012 Undergraduate Scholarship, Shanxi University

REFEREEING

Communication Physics, New Astronomy, Physics of Plasmas, Laser and Particle Beams

ORGANISATION OF WORKSHOPS

Workshop committee, 2022 7th Workshop on Magnetic Fields in Laboratory High Energy Density Plasmas (LaB), Paris, France

Workshop committee, 2021 Astrophysics with High Power Lasers and Laboratory Plasmas, Sorbonne Université, Paris, France

Conference organizer, 2018 The 4th International Conference on High Energy Density Physics, Ningbo, China

Conference organizer, 2016 The 3rd International Conference on High Energy Density Physics, Shenzhen, China

REFERENCES

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