



PIMS–UNBC Distinguished Colloquium

September 28, 2023 | 2.30pm Pacific | Room NHSC-9-235 & Online

Jingwei Hu, University of Washington

Structure-Preserving Particle Method for the Vlasov- Landau-Maxwell Equation

The Vlasov-Landau-Maxwell equation is often regarded as the first-principle physics model for plasmas, which collectively accounts for particle transport, electromagnetic field effects, and particle collisions. We introduce a novel particle method for this equation which preserves the essential physical properties including conservation of mass, momentum, and energy, and the decay of entropy. The method is based on a proper regularization of the Landau collision operator so that it can be naturally coupled with the classical particle-in-cell (PIC) method to preserve the structure. To showcase its effectiveness, we present several plasma benchmark tests such as the collisional Landau damping and two-stream instability.



Register in advance for this meeting:

<https://www.pims.math.ca/scientific-event/230928-pudcjh>

Speaker Biography:

Jingwei Hu is an Associate Professor in the Department of Applied Mathematics at the University of Washington. She also holds an adjunct professorship in the William E. Boeing Department of Aeronautics & Astronautics. She earned her Ph.D. from the University of Wisconsin in 2011 and was a postdoctoral fellow at the University of Texas at Austin from 2011 to 2014. Prior to joining UW in 2021, she held positions as an Assistant and later as an Associate Professor in the Department of Mathematics at Purdue University. Her primary research interests center around numerical analysis and scientific computing, particularly the development of efficient and structure-preserving numerical methods for multiscale kinetic equations across various science and engineering applications. Dr. Hu was honored with the NSF CAREER award in 2017 and was invited as a plenary speaker at the Canadian Applied and Industrial Mathematics Society (CAIMS) Annual Meeting in 2022. She currently serves on the editorial boards of several mathematical journals, including “La Matematica”, the official journal of the Association for Women in Mathematics (AWM), and “Kinetic & Related Models”.