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RECENT ADVANCES IN THE NUMERICAL TREATMENT OF KINETIC EQUATIONS TRACK NUMBER 700

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ABSTRACT

The reliable and efficient numerical solution of kinetic equations is of paramount interest in many application domains. A prominent example are the Vlasov–Maxwell equations that describe magnetized plasma in an up to 3+3 dimensional state space. Due to the high dimensionality, the numerical solution of such problems can be extremely expensive from a computational point of view.

In this minisymposium, we will address advances in the numerical treatment of kinetic equations. On the one hand, much progress in the field is due to new ideas from scientific computing and numerical analysis. In recent years, a considerable amount of research has been carried out on dynamical low-rank approximations, sparse grid techniques and semi-Lagrangian methods. This resulted in completely new approaches that turned out to be more efficient and/or reliable. On the other hand, progress also comes from high performance computing, such as using GPUs and other accelerators. However, the most interesting ideas emerge from a combination of these two fields.

The minisymposium addresses the whole field of kinetic equations, from numerical analysis and scientific computation to high performance computing and particular applications.