

SWIFT Users & Developers meeting 2022

Scientific Report

Numerical simulations play a key role in the toolbox of the modern astrophysicist. They allow us to understand and model phenomena which can only be observed as brief snapshots in time through telescopes. This is nowhere as true as in galaxy formation where the timescales for changes are so large that we can only comprehend what we see via virtual twins living inside our computers.

As a consequence, a flurry of models have appeared in the literature to help describe what we see. Whilst the community largely agrees on the core principles, there is still considerable disagreement on the details. The core aim of this workshop was to bring together galaxy simulation practitioners to discuss their models and start comparing the details of their ingredients and the predictions they make. The longer term goal is to develop a common open-source platform that can serve as a generic testbed for the various models and, ideally, converge on a community solution.

We have collected good descriptions of the different tools and methods used by the participants. Additionally, we have collected some tutorials on how to get started with simulation resources, which will be shared and reused.

Synergies between groups of participants have been identified and work in specific developments for new galaxy formation models, beyond the workshop, has already started. These will likely be described in forthcoming publications using them. These developments are currently considered to be added to the already publicly available galaxy formation code SWIFT, which is the main tool used by many of the participants.