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EDINBURGH FLUID DYNAMICS GROUP

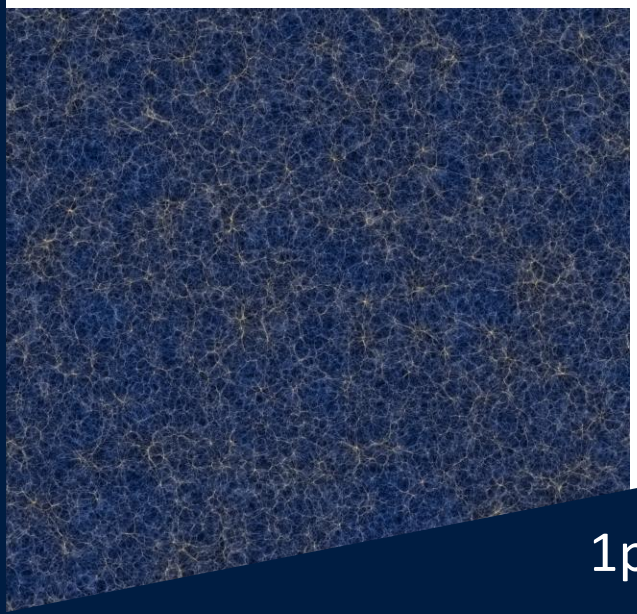
Edinburgh Fluid Dynamics Group welcomes the next speaker in series of colloquia co-funded by the Schools of Engineering, Mathematics, and Physics and Astronomy:

Prof. Matthieu Schaller

Leiden University

Simulating cosmological structure formation with trillion-particles hydrodynamics simulations

The fields of astrophysics and cosmology rely heavily on simulations and HPC to produce quantitative predictions from theoretical models. These are then confronted to the data from world-class observatories. The interpretation of this data requires equally precise simulations and the advent of the %-level accuracy era in cosmology demands simulations with volume covering the entire visible Universe with the resolution to resolve the interior of galaxies. This is a multi-scale physics exa-scale problem with coupled solvers evolving different equations in parallel. In this talk, I will discuss some of these challenges and present some of the solutions we have implemented in the SWIFT code, our scalable open-source SPH solver. The talk will focus on algorithmic and numerical aspects which have applicability beyond the domain of astronomy.



Matthieu Schaller is an assistant professor at Leiden University where he leads the numerical cosmology group. He is an expert in designing, running, developing, and analysing world-leading cosmological hydrodynamical simulations from the bottom up with a focus on SPH. For the last decade, he has led the development of the open-source SWIFT cosmological code designed to run efficiently on the largest modern HPC facilities. This package is used extensively in more than 50 institutions world wide (12 in the UK) for their research.

1pm, Wednesday 18th November

Lecture Theatre A, JCMB, King's Buildings

Refreshments will be provided after the colloquium