Simulating small-scale gas dynamics in cosmic filaments

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The missing baryons, that is, the yet-unobserved ordinary matter in the large-scale structures of the Universe, have been shown by simulations to reside mostly in filaments of the cosmic web. As this phase of the cosmic gas is becoming observable, currently in the outskirts of galaxy clusters and in short filaments, so-called bridges, it is becoming crucial to understand their detailed gas dynamics and its influence on the connected intracluster medium in galaxy clusters towards which the gas is accreted.

I will present preliminary results of a study of the gas dynamics in filaments using a high-resolution zoom-in hydrodynamical simulation of a cosmic filament, showing how gas flows, and in particular turbulence, are shaped by diverse processes such as intermittent accretion shocks or hydrodynamic instabilities.