P105a Public Release of A-SLOTH: Ancient Stars and Local Observables by Tracing Haloes

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I will present a new semi-analytical model to simulate high-redshift star formation in a cosmological context. Understanding the formation of the first stars, their feedback, and the various observable consequences of their properties is intrinsically a multi-scale problem that exceeds the capability of current numerical simulations. Semi-analytical models are suited to fill this gap and explore the parameter space of these processes. In this talk, I will present A-SLOTH (Ancient Stars and Local Observables by Tracing Haloes), our state-of-the-art semi-analytical model. The code runs on dark matter merger trees and includes self-consistent chemical, radiative, and mechanical feedback. We demonstrate that A-SLOTH reproduces various independent observables. This model has already been used to investigate the possibility of surviving metal-free stars, gravitational waves from the first stars, the nature of the Lyman-alpha emitter CR7, and to study metal-poor stars in the Milky Way. The versatile A-SLOTH code can be used by the community for making various predictions, such as star formation rates, black hole seeding scenarios, or high-z galaxy formation. The code will be made available to the community soon.