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

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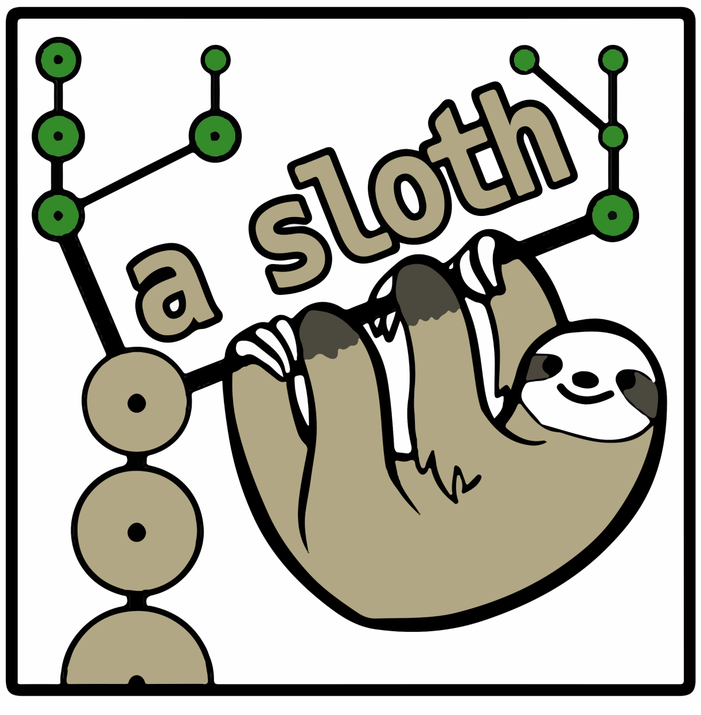
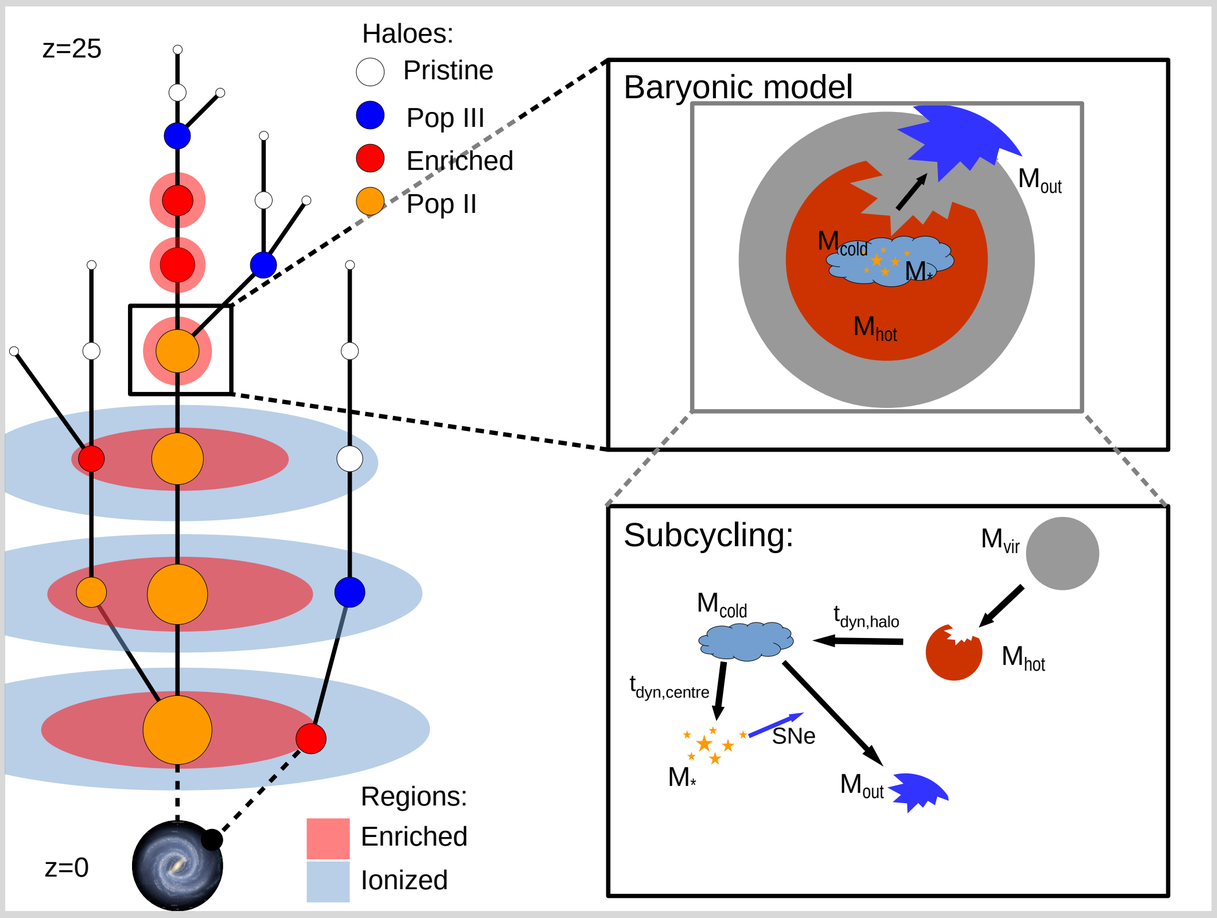


We will publicly release a semi-analytical model to simulate high-redshift star formation in a cosmological context: Understanding the formation of the first stars, their feedback, and the various observable consequences of their properties is intrinsically a multi-scale problem that exceeds the capability of current numerical simulations. **Semi-analytical models are suited to explore the parameter space** of these processes.

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.

Features & Physics

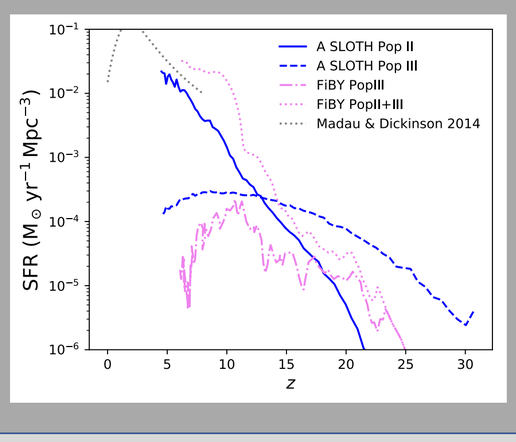


- Semi-analytical model of metal-free and metal-enriched star formation
- Based on merger trees (EPS or N-Body)
- Radiative and chemical feedback
- Fully uses spatial information
- Tracing individual elements with detailed yields
- Allows predictions for Milky Way, its satellites and cosmological high-redshift regions
- Runtime: 3 Mins for a Milky Way-like galaxy down to z=0, 90 Mins for a 8Mpc cosmological box down to z=5

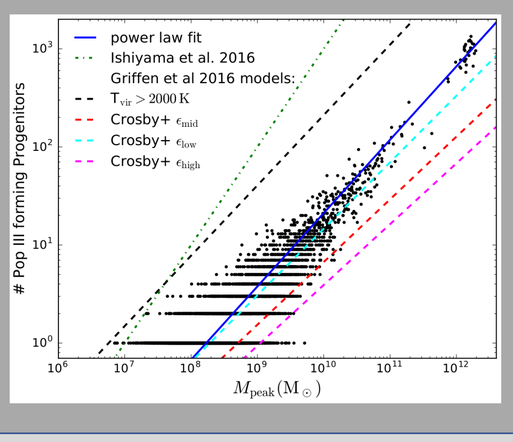
What *A SLOTH* can do (for you)

Predicting PopIII cosmic properties as sub-grid model for large scale simulations

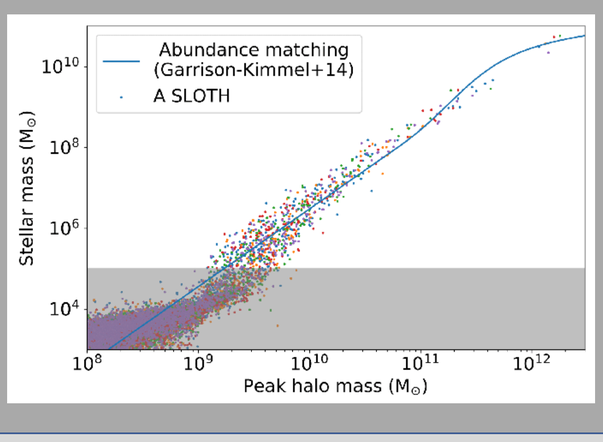
Cosmic Star Formation Rate Density (Magg et al. in prep.)



Milky Way Progenitors (Magg+18)

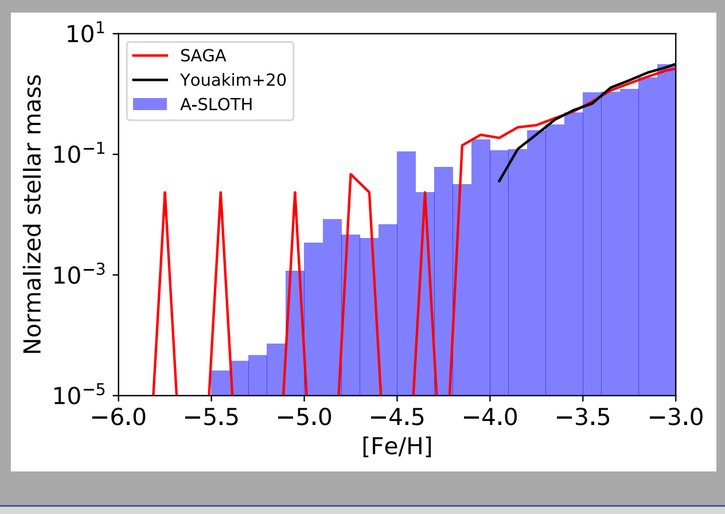


Stellar Mass to Halo Mass Relation (Chen et al. in prep.)

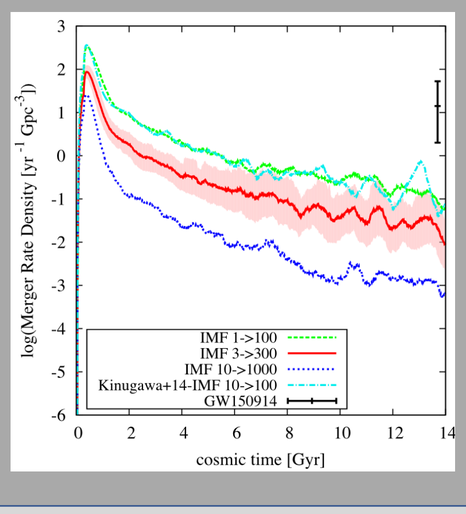


Predicting observables based on specific Pop III formation model

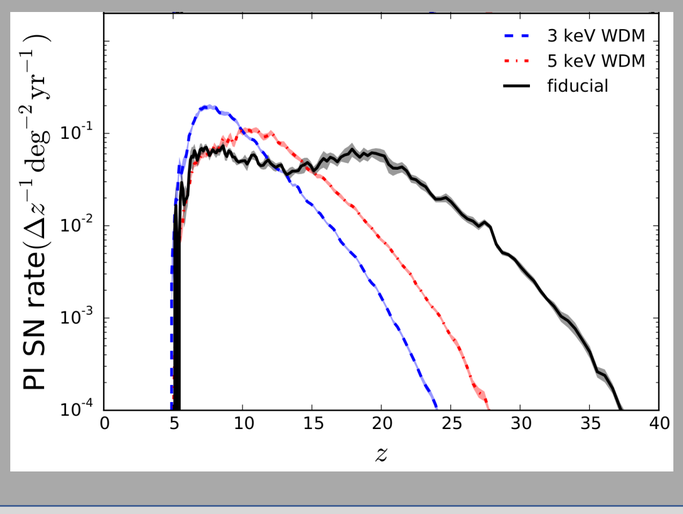
Metallicity Distribution Function (Tarumi et al. submitted)



Gravitational Waves (Hartwig+16)



Supernova Rates (Magg+16)



Contact us if you are interested!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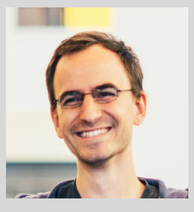
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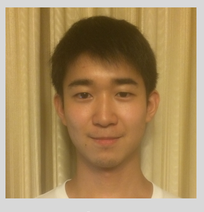
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