

AGORA High-resolution Galaxy Simulations Comparison Project

NERSC

Stellar disk morphology, CGM and satellite galaxies in the AGORA CosmoRun models

Building galaxies from scratch February 20th, 2024 Santi Roca-Fàbrega Division of Astrophysics, Lund University and the AGORA collaboration

http://agorasimulations.org

A High-resolution Galaxy Simulations Comparison Initiative: www.AGORAsimulations.org

AGORA

The AGORA Project



• Contact: santacruzgalaxy@gmail.com • Flagship paper by J. Kim et al. (2014), 2nd paper by J. Kim et al. (2016), 3rd paper by S. Roca-Fabrega et al. (2021)

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The AGORA CosmoRun

Seven participating codes widely used in the community.

A z=0 MW-mass halo - common ICs.

Calibration - reduction of the free parameters (produce a first fiducial / simplified model).

Focusing on the effects of different SNe feedback implementations.

THE ASTROPHYSICAL JOURNAL, 917:64 (24pp), 2021 August 20 © 2021. The American Astronomical Society. All rights reserved.



The AGORA High-resolution Galaxy Simulations Comparison Project. III. Cosmological Zoom-in Simulation of a Milky Way–mass Halo

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Roca-Fàbrega et al. 2024, submitted to ApJ

Paper IV - New codes, low-z

https://youtu.be/egKBqW-mOdc



New code groups joining the collaboration (AREPO, SWIFT, GADGET-4)

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Convergence on the galaxy stellar mass at low-z

Data at low-z available from most of the code groups



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Big differences in disk morphology and formation



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Big differences in disk morphology and formation



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Jung et al. 2024, accepted ApJ

Paper V - Satellite galaxies



Paper VI - The CGM

the CGM of all models

Strawn et al. 2024, accepted ApJ



-I- ART-I ENZO 14 GADGET-3 GEAR AREPO-T COS-Halos - Werk13 12 Density 10 Colum C IV Si IV CASBAH - Burchett19 CGM² - Tchernyshyov22 15.0 14.5 14.0 Ati 13.5 13.0 13.0 0 12.5 12.0 O VI Ne VIII 11.5 0.4 1.0 0.2 0.6 0.8 1.2 0.2 0.4 0.6 r/Rvi r/Rvir

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Future - Papers VII to X

Merger properties - Nguyen et al. (in prep)

Disk formation - Jung et al. (in prep)



You are welcome to participate!

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Satellite galaxies Quenching - Rodríguez-Cardoso et al. (in prep)

Isolated AGNs - Oh et al. (in prep)

Clumps Formation - (??)

New models:

- Swift
- Gadget-4
- Ramses-Vintergatan
- GIZMO-Fire

Software:

- Realistic images (Powderday-Skirt)
- Halo Catalogue based on Rockstar/ Consistent Trees

and more to come!

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ARrakibs-AGORa and the Nature of Dark Matter

(ARAGORN-DM)

Thank you!



