Withstanding the cold: energy feedback in simulations of galaxies that include a cold interstellar medium

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Propositions accompanying the thesis

WITHSTANDING THE COLD

Energy feedback in simulations of galaxies that include a cold interstellar medium

1. The calibration of simulations of galaxy formation should rely more on machine learning and emulation instead of being done manually by trial and error *(Chapter 5)*
2. Numerical algorithms used to select gas resolution elements for energy feedback in galaxy simulations should receive no less attention than the feedback models themselves *(Chapter 3)*
3. When introducing a new feedback model, one should always specify how low-probability events are handled numerically. One example thereof is kick collisions in supernova kinetic feedback *(Chapter 4)*
4. At least one supernova has gone off in the vicinity of the Solar System in the past 10 Myr *(Chapter 2)*
5. The appearance of cosmological simulations of galaxy formation that capture the multiphase nature of the interstellar medium is an important milestone in the field of galaxy formation
6. Explicit consideration of numerical, spurious effects during the development of a subgrid model of a physical process generally leads to physically more realistic simulations than developing a model from purely physical principles
7. Discrepancies between numerical simulation predictions and observational data are as important as successful matches. We should always report them along with 'more pleasing' results
8. Increasing the quality and quantity of observational data at high redshifts is crucial for further progress in numerical galaxy formation
9. The fear of being criticized for asking a (naive) question is internal to the hierarchical nature of academia and is one of the biggest obstacles for many young scientists
10. Publishing scientific papers as a foreign PhD researcher in the Netherlands is highly rewarding, but seeing how Dutch people do not switch to English after you start a conversation in Dutch is priceless

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Leiden, 27 February 2024