THE STAR FORMATION-AGN CONNECTION FROM THE CALIFA SURVEY PERSPECTIVE

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It is widely suspected the bulk of *star formation* precedes the top *AGN* phase. However, it has also been found evidence of star formation triggered by AGN feedback. Host properties and environmental conditions might then lead us to understand a connection between both phenomena. We then study environmentally-induced galaxies using CALIFA data. We start by determining their nuclear activity and current SFR to compare both with those of non-interacting, star-forming galaxies. We firstly want to corroborate that it is really the intensity of the star-forming bursts what produces the chemical differences of galaxies. Then it follows to estimate the intensity of the central and/or circumnuclear bursts and to determine whether or not it is affected by disturbers.

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NUMERICAL CONVERGENCE IN THE DARK MATTER HALOS PROPERTIES USING COSMOLOGICAL SIMULATIONS

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Nowadays, the accepted cosmological model is the so called -Cold Dark Matter (CDM). In such model, the universe is considered to be homogeneous and isotropic, composed of diverse components as the dark matter and dark energy, where the latter is the most abundant one. Dark matter plays an important role because it is responsible for the generation of gravitational potential wells, commonly called dark matter halos. At the end, dark matter halos are characterized by a set of parameters (mass, radius, concentration, spin parameter), these parameters provide valuable information for different studies, such as galaxy formation, gravitational lensing, etc. In this work we use the publicly available code Gadget2 to perform cosmological simulations to find to what extent the numerical parameters of the simulations, such as gravitational softening, integration time step and force calculation accuracy affect the physical properties of the dark matter halos. We ran a suite of simulations where these parameters were varied in a systematic way in order to explore accurately their impact on the structural parameters of dark matter halos. We show that the variations on the numerical parameters affect the structural parameters of dark matter halos, such as concentration, virial radius, and concentration. We show that these modifications emerged when structures become nonlinear (at redshift 2) for the scale of our simulations, such that these variations affected the formation and evolution structure of halos mainly at later cosmic times. As a quantitative result, we propose which would be the most appropriate values for the numerical parameters of the simulations, such that they do not affect the halo properties that are formed. For force calculation accuracy we suggest values smaller or equal to 0.0001, integration time step smaller o equal to 0.005 and for gravitational softening we propose equal to 1/60th of the mean interparticle distance, these values, correspond to the smaller values in the numerical parameters variations. This is an important numerical exercise, since for instance, it is believed that galaxy structural parameters are strongly dependent on dark matter halo structural parameters.

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