TESTING THE MERGING HYPOTHESIS FOR THE ISOLATED GALAXY UGC10205 USING CALIFA DATA

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The galaxy UGC10205 is analyzed using Integral Field Spectroscopy (IFS) data from the Calar Alto Legacy Integral Field Area Survey (CALIFA). The understanding of the current state of this object represents a challenge because it is an extremely isolated galaxy, located in a void, which shows evidence of a possible recent merger. Our aim is to confirm whether there was such a merger and try to infer their precursors by means of a complete analysis of the properties of stellar populations, corresponding to metallicity, age, extinction and mass in stars. We first applied an uncertainty study taking on account two error sources, one directly from the data and the second from the fitting codes (Fit3D and Starlight), and models derived from population synthesis used for determining the physical properties of the galaxy. We found from our study of uncertainties that the optimal value of S/N to determine the properties of the stellar populations is 30, then we proceeded to apply a Voronoi binning on the datacube with this S/N value as lower limit. We then obtain Star Formation Histories in different regions of this galaxy and also the radial variations of the physical properties, which suggest this galaxy was formed inside-out. We also looked for local outliers from the mean values of the physical properties as tracers of a possible merger. We contrast the star formation histories with the hypothesis from the N-Body simulation of an encounter between UGC10205 and a small elliptical galaxy, performed by Reshetnikov and Evstigneeva (1999, Astron. Rep., 43, 367), where they determined by the dispersion of the particles and the current distribution of the tidal structure that the interaction took place $\sim$ 200 Myrs ago. We also present a preliminary study on the state of ionization of the gas that agrees this is a star-forming galaxy.

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CALCULATING THE SACHS-WOLFE EFFECT FROM SOLUTIONS OF NULL GEODESICS IN PERTURBED FRW SPACETIME

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In the upcoming precision era in cosmology, fine grained effects will be measured accurately. In particular, the late integrated Sachs-Wolfe (ISW) effect measurements will be improved to levels of unprecedented precision. The ISW consists on temperature fluctuations in the CMB due to gravitational redshift induced by the evolving potential well of large scale structure in the Universe.

Currently there is large controversy related to the actual observability of the ISW effect. In principle, it is expected that, as an effect of the late accelerated expansion of the universe motivated by the current amount of dark energy, large scale structures may evolve rapidly, inducing an observable signature in the CMB photons in the way of a ISW anisotropy in the CMB. Tension arises since using galaxy redshift surveys some works report a temperature fluctuations with amplitude smaller than predicted by the Lambda-CDM. We argue that these discrepancies may be originated in the approximation that one has to make to get the classic Sachs-Wolfe effect.

In this work, we compare the classic Sachs-Wolfe approximation with an exact solution to the propagation of photons in a dynamical background. We solve numerically the null geodesics on a perturbed FRW spacetime in the Newtonian gauge. From null geodesics, temperature fluctuations in the CMB due to the evolving potential has been calculated. Since solving geodesics accounts for more terms than solving the Sachs-Wolfe (approximated) integral, our results are more accurate. We have been able to substract the background cosmological redshift with the information provided by null geodesics, which allows to get an estimate of the integrated Sachs-Wolfe effect contribution to the temperature of the CMB.

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