WHAT DRIVES THE STELLAR MASS GROWTH OF EARLY-TYPE GALAXIES? BORN OR MADE: THE SAGA CONTINUES...

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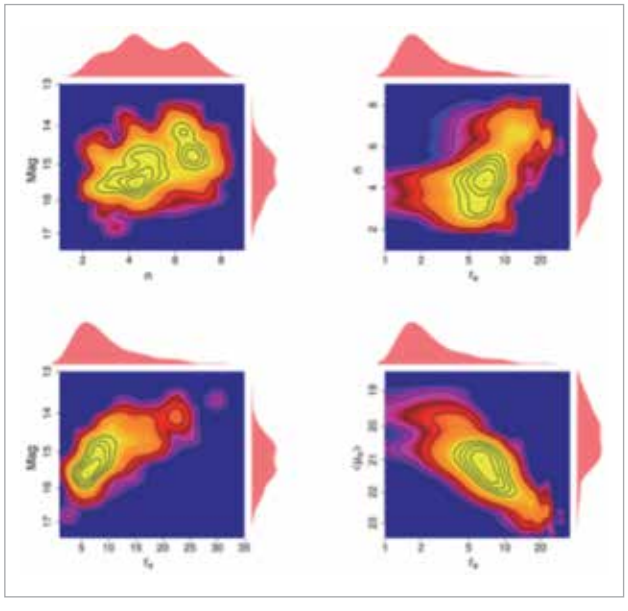
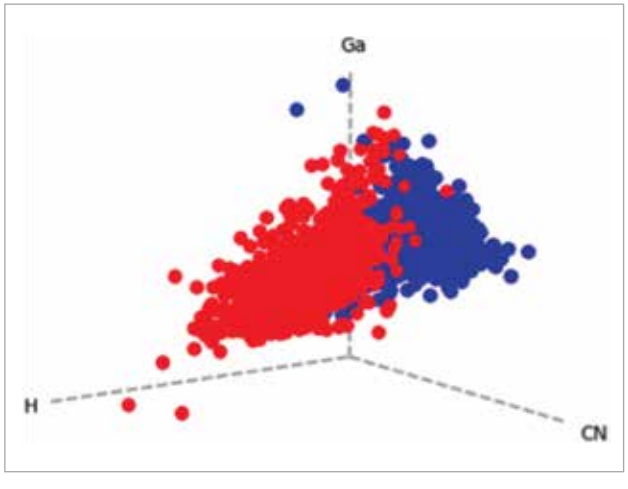
Apart from the fact that studying the way galaxies evolve through cosmic time is complex in nature, some of the challenges of this project are related to two primary aspects. One is the development of the GPU version of BIE, which will enable GALPHAT to run two or three orders of magnitude faster. Beyond this specific application, BIE is a full set of libraries for performing Bayesian inference and may be extremely useful for other analyses done during this project and others as well. We will make BIE available on different platforms, so that its usage can be enlarged to all segments of our community. The second and maybe more important aspect of this project is to investigate the reality of the IMF variation with galaxy mass, a very controversial subject in current literature. The importance of this finding is directly linked to the fact that the implications are enormous. By studying the ETG properties in different environments and especially focusing on the star formation history in these systems we expect to unravel the intricate process of generating an IMF. The simulations we are planing to do together with the specific study of the stellar population models promise to be very effective tools to gain understanding of the physics behind the IMF.

MORPHOMETRY



GALPHAT



Our project aims to study how ETGs form and evolve through the investigation of their photometric and spectroscopic properties and environmental dependences. Among the expected fundamental results are: 1) the translation of the BIE package to a GPU architecture, which will be of paramount importance not only to our immediate goal (having GALPHAT running on a GPU cluster) but also to other astrophysical analyses where a Bayesian scheme may be needed; 2) Developing MORFOMETRYKA and GALPHAT for GPUs will allow us to have an unbiased statistical analysis of a large sample of ETGS. The Bayesian approach applied to images in the optical and infrared promises to be essential to study galaxy properties and how they depend on the environment where they reside. Three main results can be listed at this point of the project: 1) a working version of GALPHAT fully automatic described in Stalder et al. (2017, AJ, submitted); 2) A package for morphological analysis of galaxy images, described in the paper Sauter et al. (2017, submitted to AJ); and the development of a framework where environment is characterized by the velocity distribution of galaxies in a cluster, presented de Carvalho et al. (2017, submitted to AJ).

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