[1] Grupo de Astrofísica, Universidade Federal de Santa Catarina, Brazil (eduardo@astro.ufsc.br; bap@astro.ufsc.br).

MASS SEGREGATION OF YOUNG STAR CLUSTERS

J. Yu[1]

Mass segregation of the young star cluster is one of the dynamical properties which is an important tool to investigate the star forming process and dynamical evolution of star clusters. The origin of this mass segregation has been suggested as either primordial, that is, it is a result of the star formation process in which stars form mass segregated from their parent molecular cloud, or dynamical, i.e., resulting from fast dynamical evolution. Recent N-body simulations suggest initially dynamically cool and sub-structured star clusters can be mass segregated within very short timescale. We investigate the influence of different initial parameters to further constrain our theoretical model for young-mass segregated star clusters. In particular, we focus on the correlation between the morphology and the degree of mass segregation of the early evolution of young star clusters. We find that young star clusters cannot be highly mass segregated while they are still fractal. Therefore, we conclude that mass segregation of young star clusters is unlikely to be purely dynamical.

[1] Pontificia Universidad Católica de Chile (yujc@astro.puc.cl).

GALAXIES

STELLAR FEEDBACK FROM BLACK-HOLE HIGH-MASS X-RAY BINARIES IN GALAXY FORMATION MODELS

M. C. Artale[1,2], P. B. Tissera[1,2], and L. J. Pellizza[1,3]

In recent years, many works have suggested the role of black-hole high-mass X-ray binaries (BH-HMXB) as potential sources of heating and re-ionization in the interstellar and intergalactic medium. Furthermore, because of the suggested increase of their production rate and X-ray luminosity with decreasing metallicity, BH-HMXBs could be relevant to explain the thermal and ionization history of the Universe at its early stages. As observations indicate, a meaningful amount of the energy released by these sources could be deposited in the local interstellar medium, suggesting that BH-HMXB could modify star forming regions on the host galaxy. In this work, we study the kinetic BH-HMXB feedback using hydrodynamical cosmological simulations which also include SNe feedback. Our preliminary results suggest that BH-HMBXs feedback is not efficient at modifying the star formation activity. However, due the complexity of the problem and the wide dynamical range needed to describe properly different physical events, there are still different schemes to explore. In the future, we will study the role of BH-HMXBs in high numerical resolution simulations at high redshifts, and how the energy is released into the interstellar medium.

[1] Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina.
[2] Instituto de Astronomía y Física del Espacio, Buenos Aires, Argentina.
[3] Instituto Argentino de Radioastronomía, Berazategui, Argentina.

THE LMC OUTER DISK STELLAR POPULATION IN THE LIGHT OF THE DARK ENERGY SURVEY

E. Balbinot[1,2], B. Santiago[1,2], L. Girardi[4], L. N. da Costa[2,3], and M. A. G. Maia[2,3]

The outermost regions of the Large Magellanic Clouds (LMC) have recently been covered by Dark Energy Camera (DECam) Science Verification data, in preparation for the Dark Energy Survey (DES). Although the DES footprint misses the bar and main star forming regions of the LMC, the available data sample a large and continuous area of the LMC disk down to $r \simeq 24$ at distances greater than 5 degrees from its center. This large surveyed region opened the possibility to study the outer LMC star formation history (SFH) with unprecedented detail. In this work we employ the partial models method (Gallart et al 1999; Javiel et al 2005) to recover the SFH and its spatial variations in the outskirts of the LMC from the observed colour-magnitude diagrams. We take the MW foreground stars into account by modelling them with TRILEGAL (Girardi et al. 2005). With this technique we were able to recover the spatial dependency of the LMC outer components SFH and estimate its extension as well as the inclination and depth of the LMC disk. As a byproduct of our

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