X3), considering the model above and leptonic and hadronic processes.

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HIGHLIGHTS ON γCAS-LIKE STARS

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The number of Be stars with unusually hard-thermal and variable X-ray emission like that of γ-Cassiopeiae increased from one to ten in seven years. It is possible that they could be progenitors of magnetars or account for the missing number of Be/WD binaries observed, and this can be further tested through careful characterization of the parameter space in which the X-ray emission occurs. Here, we present a compendium of the optical and X-ray properties of a sample of this new class of X-ray emitters and some very recent results presented by our group. We discuss the current understanding and emphasize results that strengthen the interpretation of magnetic activities near the Be star as being the source of the X-ray emission.

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PROPERTIES OF GALAXY GROUPS SELECTED FROM CHANDRA X-RAY OBSERVATIONS OF THE BOÖTES FIELD

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Galaxy groups are not simply scaled down versions of rich clusters (e.g. Mulchaey 2000, Voit 2005). Due to a group's shallow gravitational potential, feedback processes play an important role in the group's evolution. It is important to understand galaxy groups since, in hierarchical clustering, they are the building blocks of large scale structure. Thus, in addition to determining the characteristics of groups, it is important to determine the mass function over the range that includes poor clusters and groups. We present the properties of the galaxy groups selected in the Chandra X-Boötes survey (Kenter et al. 2005). Group redshifts are measured from the AGES (Kochanek et al. 2012) spectroscopic data. We use photometric data from the NOAO Deep Wide Field Survey (NDWFS) (Jannuzi & Dey 1999) to estimate the group richness (N_{gals}) and the optical luminosity (L_{opt}). Our final sample comprises 32 systems at $z < 0.80$, with 14 below $z = 0.35$. For these systems we estimate velocity dispersions (σ_{gr}) and perform a virial analysis to obtain the radius (R_{200} and R_{500}) and mass (M_{200} and M_{500}) for groups with at least five galaxy members. We use the Chandra X-ray observations to derive the X-ray luminosity (L_X). We examine the performance of the group properties σ_{gr}, L_{opt} and L_X, as proxies for the group mass. Understanding how these observables measure the total mass is important to estimate how well the cluster/group mass function is determined. By extending the mass function to the group regime, we predict the number of groups that new X-ray surveys, eROSITA, will detect.

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COSMOLOGY

GAUSSIAN ANALYSES ON PLANCK CMB MAPS

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Extremely precise cosmic background radiation (CMB) data from *Planck* satellite confirmed the cosmological model ΛCDM and established tight constraints for several features of the primary and secondary CMB temperature fluctuations. Possible non-Gaussian (NG) contributions to the CMB field could be originated during (or soon after) primordial cosmic inflation, where the types, scale dependences, and intensities expected depend on the inflationary models. For this, the robust detection –or not– of primordial NG in the CMB signify a unique probe to the early universe, allowing to distinguish between competing models. Recent analyses from *Planck* CMB data strongly limit the level of NG and show consistency with the Gaussian hypothesis although they do not exclude the presence of weak Gaussian deviations. A problem inherent with the confidence of a positive detection is the possibility that any non-primordial contamination could be