ALPHA & HEAVY ELEMENTS ABUNDANCES OF NEARBY BULGELIKE DWARF STARS

L. Pompéia[1], B. Barbuy[1], M. Grenon[2]
1 - Instituto Astronômico e Geofísico - USP , Brazil
2 - Observatoire de Genève

A sample of nearby bulgelike dwarf stars, with special kinematical properties and probable origin near the bulge, is studied. Ages derived by using isochrones give 10-11 Gyr for these stars and metallicities range -0.80 = [Fe/H] = +0.40 dex. We calculate stellar parameters from spectroscopic data, and chemical abundances of alpha, r and s -process elements are derived by using spectrum synthesis. We found that alpha-elements ratios relative to iron behave in different ways depending on the element. Ca, Si and Ti decline smoothly for increasing metallicities, and follow the disk pattern with greater similarity to stars of small galactocentric distances. Similar pattern is found for Ca and Si relative to bulge stars of McWilliam & Rich (1994) and Rich & McWilliam (2000). Mg and O, the main products predicted for massive supernovae (Timmes et al. 1995) and also the r–process element Eu, are overabundant relative to disk stars, with a steep decline in [Fe/H] -0.3. s-elements abundance ratios show no apparent trend with metallicity, with roughly solar values. References: McWilliam, A., Rich, R. M. 1994, ApJS, 91, 749 Rich, M., McWilliam, A. 2000, Proc. SPIE Vol. 4005, p. 150-161, Discoveries and Research Prospects from 8- to 10-Meter-Class Telescopes, ed. Jacqueline Bergeron Timmes, F. X., Woosley, S. E., Weaver, T.A. 1995, ApJS 98, 617

EXTRAGALÁCTICA

LOCALIZATION AND OBSERVATION OF GRB010921 BY THE HETE SATELLITE

J. Braga[1], G. Ricker[2], K. Hurley[7], D. Lamb[10], S. Woosley[9], J-L Atteia[5], N. Kawai[3,16], R. Vanderspek[2], G. Crew[2], J. Doty[2], J. Villasenor[2], G. Prigozhin[2], G. Monnelly[2], N. Butler[2], M. Matsuoka[13,15], Y. Shirasaki[14,15,16], T. Tamagawa[16], K. Torii[16], T. Sakamoto[3,16], A. Yoshida[13,16], E. Fenimore[4], M. Galassi[4], T. Tavenner[4], T. Donaghy[10], C. Graziani[10], M. Boer[5], J-P Dezalay[5], M. Niel[5], J-F Olive[5], G.Vedrenne[5], T. Cline[10], J.G. Jernigan[7], A. Levine[2], F. Martel[2], E. Morgan[2], R. Manchanda[11], G. Pizzichini[6], K. Takagishi[12], M. Yamauchi[12]
1 - Instituto Nacional de Pesquisas Espaciais (INPE)
2 - Massachusetts Institute of Technology (MIT)
3 - Tokyo Institute of Technology, Japan
4 - Los Alamos National Laboratories, USA
5 - Centre d'Etude Spatiale des Rayonnements, France.
6 - Consiglio Nazionale delle Ricerche, istituto TESRE, Bologna, Italy
7 - University of California, Berkeley Space Sciences Laboratory, USA
8 - University of California, Santa Cruz, CA, USA
9 - NASA/Goddard Space Flight Center, Greenbelt, MD, USA
10 - University of Chicago, Chicago, IL, USA
11 - Tata Institute of Fundamental Research, Mumbai, India
12 - Faculty of Engineering, Miyazaki University, Japan
13 - Department of Physics, Aoyama Gakuen University, Tokyo, Japan
14 - Japan Science and Technology Corporation (JST), Japan
15 - National Space Development Agency of Japan (NASDA), Japan
16 - RIKEN (The Institute of Physical and Chemical Research), Japan

The HETE satellite was successfully launched into equatorial orbit on 9 October 2000 and is the first space mission entirely devoted to the study of gamma-ray bursts (GRBs). HETE utilizes a matched suite of low energy X-ray, medium energy X-ray, and gamma-ray detectors mounted on a compact spacecraft. A unique feature of HETE is its capability for localizing GRBs with ~1-10 arcmin accuracy in real time aboard the spacecraft. GRB locations are transmitted, within seconds to minutes, directly to a dedicated network of telemetry receivers at 13 automated "Burst Alert Stations" (BAS) sited along the satellite ground track. One of these stations is located at Natal, RN. The BAS network then re-distributes the GRB locations world-wide to all interested observers via Internet

and the GRB Coordinates Network (GCN) in ≈1 s. Thus, prompt optical, IR and radio follow-up identifications can be anticipated for a large fraction of HETE GRBs. On September 21, 2001, the FREGATE γ-ray instrument on HETE detected a bright GRB. The burst was also seen by the X-detector on the WXM X-ray instrument and was therefore well-localized in the X direction; however, the burst was outside the fully-coded field-of-view of the WXM Y-detector, and therefore information on the Y direction of the burst was limited. Cross-correlation of the HETE and *Ulysses* time histories yielded an Interplanetary Network (IPN) annulus that crosses the HETE error strip at a ~45 degree angle. The intersection of the HETE error strip and the IPN annulus produces a diamond-shaped error region for the location of the burst having an area of 310 square arcminutes. Based on the FREGATE and WXM light curves, the duration of the burst is characterized by a t_{90} = 18.4 s in the WXM 4 – 25 keV energy range, and 23.8 s and 21.8 s in the FREGATE 6 – 40 and 32 – 400 keV energy ranges, respectively. The fluence of the burst in these same energy ranges is 4.8 10^{-6}, 5.5 10^{-6}, and 11.4 10^{-6} erg cm^{-2}, respectively. Subsequent optical and radio observations by ground-based observers have identified the afterglow of GRB010921 and determined an apparent redshift of z = 0.450.

THE LOW-LUMINOSITY END OF THE STARBURST-AGN CONNECTION: LINERS AND TRANSITION OBJECTS

Roberto Cid Fernandes, Rosa González-Delgado[2], Henrique Schmitt[3], Thaisa Storchi-Bergmann[4], Tim Heckman[5], Claus Leitherer[6]
1 - UFSC
2 - IAA-Espanha
3 - NRAO-EUA
4 - IF-UFRGS
5 - JHU-EUA
6 - STScI-EUA

Much is said about the connection between Starbursts and AGN, but so far this connection has only been studied in the moderate to high luminosity regime of Seyfert galaxies and quasars. Our previous work has concentrated on type 2 Seyferts, where we have found a high incidence of circum-nuclear starbursts. In these composite starburst+AGN systems the starbursts account for a substantial fraction of the global energetics. Little, however, is known about starbursts around less luminous (but more numerous!) AGN such as LINERs and Transition Objects. Does the Starburst-AGN connection traced by Seyferts extend to the low-luminosity end of the activity scale? This question can be rephrased in the jargon of Low Luminosity AGN (LLAGN) studies. LLAGN are subdivided into LINERs and Transition Objects (TOs). The latter are defined as systems whose emission line ratios straddle the AGN and HII-region loci on diagnostic diagrams, which

indirectly suggests the presence of a starburst component. Is that so? Do TOs harbour circum-nuclear starbursts? Could they be scaled down versions of the composite starburst + AGN systems found in Seyfert galaxies? In order to answer this question we have carried out a spectroscopic survey of 44 LINERs and TOs using the N.O.T 2.5m and Kitt Peak 2.1m telescopes. The spectra cover the 3500–5400 Å range with a resolution of 2.5 Å and S/N >30. This range contains a number of *stellar* features which provide a *direct* diagnostic of the presence of starbursts, such as the high order Balmer lines (typical of old starbursts, ~10^8 yr) and the WR bump (<10^7 yr). Other stellar lines, such as CaII K and the G band are also useful to characterize the stellar content. In particular, they have proved instrumental in identifying composite starburst+AGN composites by means of empirical population synthesis techniques developed by our group. Here we report preliminary results of the analysis of these data. So far our main results are: (1) High order Balmer lines have been detected in many LINERs and TO's. (2) These same lines were also detected in a couple of low-luminosity Seyfert 1's! (3) The empirical population synthesis analysis separates the sample onto two blocks: those with and those without circum-nuclear starbursts. All indications are that Transition Objects are indeed composite systems and thus that the Starburst-AGN connection is not restricted to luminous galaxies.

GRAVITACIONAL LENSING IN THE MOST MASSIVE CLUSTERS

Eduardo Serra Cypriano[1], Laerte Sodre Jr.[1], Jean-Paul Kneib[2], Luis Campusano[3]
1 - IAG/USP
2 - Obs. Midi-Pyrenees
3 - Univ. de Chile

We have studied the mass content and distribution in a sample of 32 X-ray luminous galaxy clusters using the weak-lensing technique. Mass maps were obtained using a non-parametric reconstruction procedure and the mass inside a given radius was estimated using the single isothermal sphere model to fit the weak shear data. We find that there is a good correlation between mass and X-ray luminosity or temperature. We also find that the cluster A2163, one of the most X-ray luminous cluster known, is a clear outlier in these relations. The mass to luminosity relation found for the whole sample is M/L ~ 300h (solar unities).