A Search for Giant Shells around High-Redshift Radio Loud AGNs

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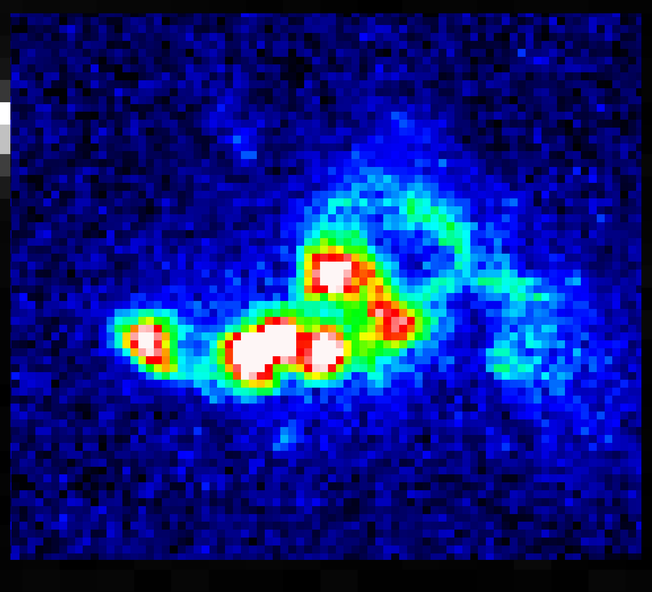
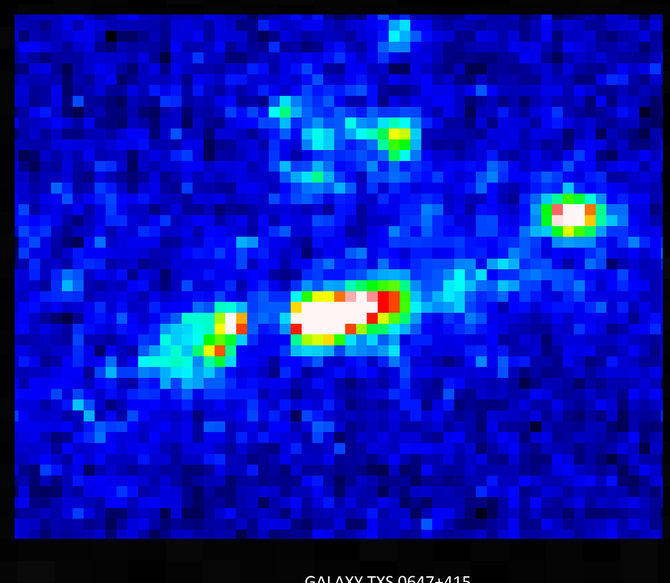
Abstract / At high redshift ($z > 2$) most powerful radio-loud AGNs show 10-100 kpc scale Lyα emitting nebulae, and around half also show strong spatially extended HI Lyα absorption features in their spectra (van Ojik et al. 1997). The observed properties of this absorbing gas strongly implies that is part of an expanding super shell of gas, driven by a powerful feedback event (or events) (Binette et al. 2000; Humphrey et al. 2008, 2012).
In this poster we show preliminary results from our study of the large-scale gaseous environments of high-z radio galaxies, using archival HST images and deep spectroscopy from the 10.4 m Gran Telescopio Canarias. Our main goal is to examine the physical properties of the giant gaseous structures associated with high-z radio galaxies, with emphasis on elucidating the nature of the large-scale HI Lyα absorbers.



GALAXY TXS 0828+193



GALAXY TXS 0647+415

1. INTRODUCTION

Many powerful radio galaxies at redshift z > 2 are embedded within giant nebulae of ionized gas wich strongly emit both metal lines and the recombination lines of H and He (Mc Carthy et al. 1987, ; Vilar Martín et al. 2003) . In adittion, they often show strong absortion features in LyAlpha (van Ojik et al. 1997 ; Wilman et al. 2004), and sometimes in metal lines such as CIV(Binette et al. 2000 ; Jarvis et al. 2003).

2. IMAGES

This work is based on HST high redshift galaxies images and its main objective is to detect and measure the magnitudes of their shells. To that effect, photometric images of the high redshift galaxies TXS 0922-218, [KHV 2011] 9, [KHV2011] 12, TXS 0647+415, TXS 0902+343, and TXS 0828+193, were retrieved from HST database. These images were taken with HST instruments Advanced Camera for Surveys (ACS), Wide Field Planetary Camera 2 (WFPC2) and Wide Field Camera 3 (WFC3).

3. MEASUREMENTS

We have placed constraints on the brightness of the putative shells using annular photometric apertures of inner and outer radii of 50 and 60 kpc, respectively (see table of results). The next step will be to compare these magnitudes against those expected for different shell and scattering/illumination geometries in order to constrain the physical properties of the putative shells, e.g., gas mass, column density, dust content, etc.

4. RESULTS

In the next table are given the obtained magnitudes of every galaxy shell in the descripted rings.

5. SUMMARY

By combining retrieved from HST Database images were obtained several reduced images of the galaxies TXS 0922-218, [KHV 2011] 9, [KHV2011] 12, TXS 0647+415, TXS 0902+343, TXS 0828+193, TXS 0211-122, in different filters. The brightness of large-scale gaseous shells, whose existence was predicted based on previous spectroscopic studies, were constrained by photometric measurements.

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Galaxy	Redshift	Instrument	Filter	Date	m_{shell}
TXS 0922-218	5.19	ACS	F775W/CLEAR2L	07/06/2003	21.1±0.2
[KHV 2011] 9	4.404	WFPC2	F675W	21/09/1998	21.6±0.4
[KHV2011] 12	4.404	WFPC2	F675W	21/09/1998	22.6±0.6
TXS 0647+415	3.792	WFC3	F105W	29/08/2010	24±2
TXS 0828+193	2.572	ACS	F606W	28/03/2010	22.9±0.5