

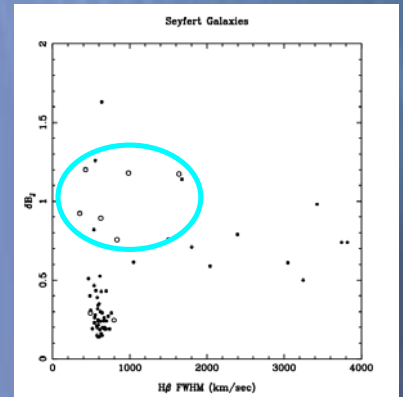
# Are strongly variable Seyfert 2 galaxies really AGN without a BLR?

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Strong amplitude optical brightness variability has been found in a sample of Seyfert 2 galaxies ("Naked AGN", Hawkins 2004). The variability suggests that the nuclear source is seen directly, contradicting the complete absence of broad emission lines as simple Unified Models for AGN would predict. Alternatively the Broad Line Region might be missing in these sources. Here we present the results obtained from XMM-Newton observations coordinated quasi-simultaneously with ground-based optical spectroscopy. This have offered a privileged window into the central engine to understand the absorption properties of these objects and relate them to their optical appearance.

In the last few years the number of cases in which observations do not match with Unified Models is increasing both in the local and in the distant universe. Type 1 AGN with significant absorption have been found (Cappi et al. 2005, Mateos et al. 2005, Fiore et al. 2001, etc.) as well as type 2 AGN without X-ray absorption (Caccianiga et al. 2004, Corral et al. 2004, Barcons, Carrera & Ceballos 2003, Panessa & Bassani 2002, Pappa et al. 2001). Recently, also three X-ray unobscured type 2 QSO without broad emission lines have been spotted (Wolter et al. 2005).

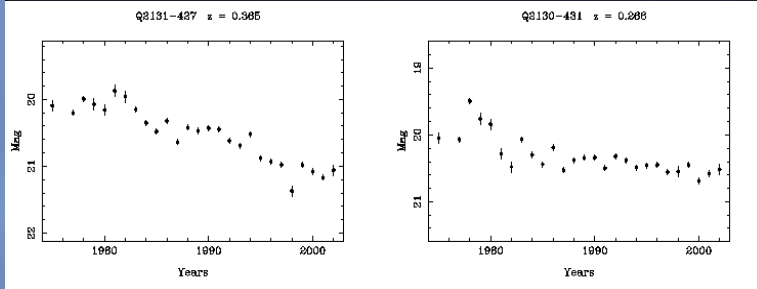
Hawkins



## SAMPLE of NAKED AGN:

This is a sample of active galaxies which have been 'photometrically' monitored over the last 25 years (Hawkins 2004). Optical spectra (obtained in July 2002) pinpoint a class of objects (6 in that sample) which show large [OIII]5007/Hbeta typical of type 2 Seyferts (type 1 Seyferts have [OIII]5007/Hbeta < 3), no sign of broad emission lines but large amplitude variations normally only found in type 1 objects. Brightness varied at least by a factor of 3 on a timescale of 5-10 years and also on shorter time scales. Variable absorption is ruled out as a possible explanation of these properties at least in Q2131-427 object because its narrow line optical spectrum was essentially unchanged while it brightened by almost one magnitude. The only remaining possibility is the absence of a BLR in these sources, implying that we are dealing with the so-called 'True type 2 AGN' (Tran 2001). It has been suggested that the formation of the BLR is somehow linked to the accretion physics in AGN (Nicastro 2000, Williams et al. 1999). The lack of BLR in AGN could represent either a phase in the evolutionary history of all AGN or a genuine new class of objects, implying a substantial revision of the simple version of Unified Models.

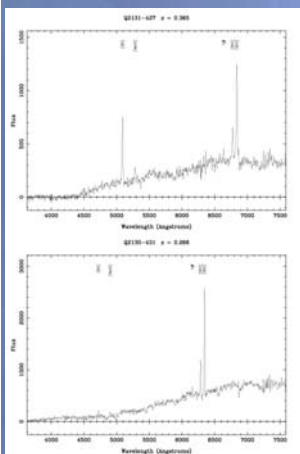
### Optical variability observed in Naked AGN is typical of type 1 AGN



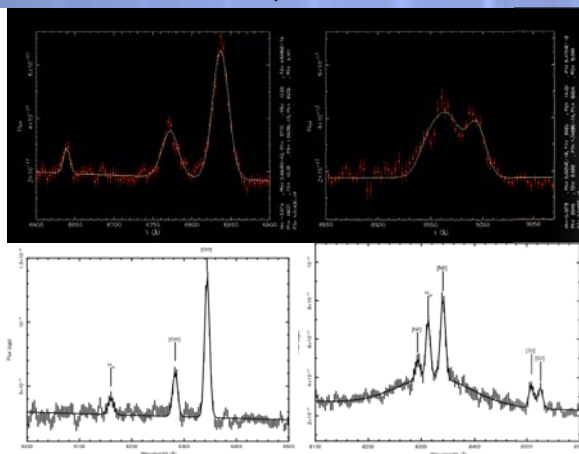
- New class of AGN discovered in a large-scale monitoring program over 25 years with a spectroscopy follow up: 55 Seyfert galaxies
- Group of Type 2 Seyferts with H(beta) FWHM < 1000 km/s and large [OIII]/H(beta)
- SIX of these type 2 Seyfert galaxies show also high variability typical of type 1, resembling type 1 AGN from their optical characteristics
- DO THESE OBJECTS LACK THE BLR OR SIMPLY show VARIABILITY?
- To exclude variability, SIMULTANEOUS OPTICAL X-RAY OBSERVATIONS HAVE BEEN PERFORMED FOR TWO OF THEM

## KEY STRATEGY TO OBSERVE THESE SOURCES: SIMULTANEOUS OPTICAL and X-RAY OBSERVATIONS

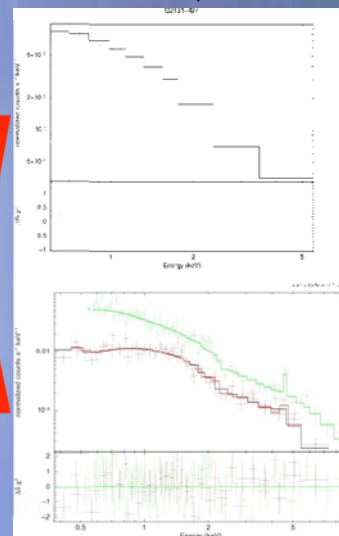
### SPECTRA REPORTED IN HAWKINS 2004:



### OPTICAL DATA FROM (La Silla, ESO) Observations performed November 2006



### XMM-Newton Observations performed November 2006



XMM-Newton spectrum of Q2131-427: Gamma= 1.8 N<sub>h</sub> = 3 10<sup>20</sup> cm<sup>-2</sup>

XMM-Newton spectrum of Q2130-431: Gamma= 1.9 N<sub>h</sub> < 4 X 10<sup>20</sup> cm<sup>-2</sup> E(line) = 5.9 keV EW = 350 eV

### CONCLUSIONS (Panessa et al. in preparation):

From our simultaneous observation of the X-ray and optical spectra of a new class of AGN we can conclude that:

- Q2130-431 is a type 1.9 Seyfert galaxy with evidence of a BLR and a typical type 1 Seyfert X-ray spectrum
- Q2131-427 is a type 2 Seyfert galaxy with no evidence of X-ray absorption in the X-ray spectrum -- TRUE TYPE 2 SOURCE CANDIDATE -- The Eddington ratio is consistent with being below the threshold needed to create the BLR, as predicted from the Nicastro 2000 model.

### Hawkins spectra available only in the OIII-Hbeta range FROM La Silla optical spectra:

Q2131-427: No evidence of a broad line component  
FWHM (Hbeta) = 400 km/s  
FWHM ([OIII]) = 1100 km/s  
FWHM (Halpha) = 1100 km/s  
Q2130-431: Broad Component of the Halpha  
THIS SOURCE IS CLASSIFIED as a TYPE 1.9 Seyfert galaxy

SIMULTANEOUS

F(X)/F(OIII) = 24  
TRUE TYPE 2 AGN without BLR!!!  
Eddington ratio = 5.1e-4 -> below the la-3 value, Nicastro (2000)