

# 3DNTT

**Large Programmes**  
(selected by ESO's OPC in 2006)

- Characterizing the interstellar medium of nearby galaxies with 2D maps of extinction and abundances (Marcelin et al.)

*51 nights (2 periods)*

- Gas Accretion & Radiative Feedback in the Early Universe (Bland-Hawthorn et al.)

*20 nights (2 periods)*

# Large Programme « Galaxies »

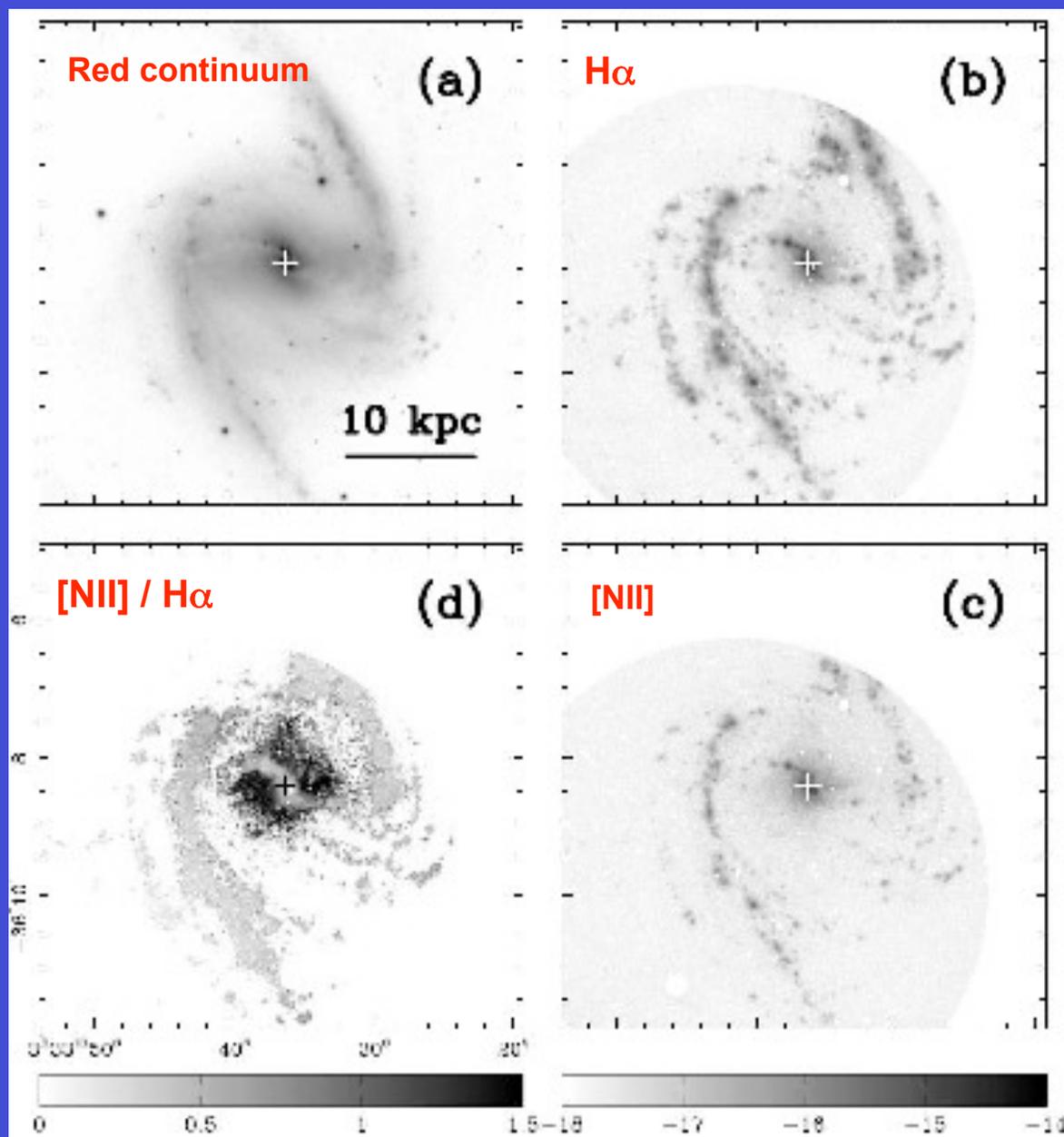
Observation of the ionized gas in SINGS galaxies (43 out of 75 can be observed from La Silla) with Tunable Filter in order to map :

- stellar formation
- dust extinction and metal abundance (from line ratios maps)
- observed lines :
  - [OII] 372.7 nm
  - H beta 486.1 nm
  - [OIII] 495.9 - 500.7 nm
  - [NII] 654.8 - 658.4 nm
  - H alpha 656.3 nm

# Example of 2D maps produced by a Tunable Filter

NGC1365 observed with the TTF on the AAT for measuring metal abundance from line ratios

(Veilleux et al. 2003)



## Goal :

Better understanding of the nature, origin and evolution of these galaxies, comparing the 3DNTT maps with maps obtained in FIR (MIPS/Spitzer) and UV (Galex) for a detailed analysis of extinction and its relation with other physical quantities such as metal abundance.

The data obtained for nearby galaxies will have a high resolution (both spatial and spectral) and will serve as a reference sample for studies at larger redshift.

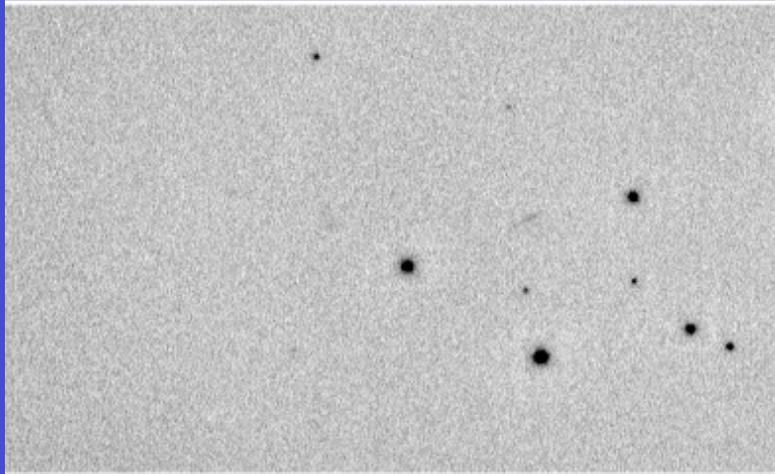
# Large Programme « QSOs »

Observation of 30 quasars at  $z \sim 2$  in the Lyman alpha line (redshifted at 380 to 400 nm for  $z \sim 2.2$  to 2.3) with the Tunable Filter, with 5 deep images for each target (one at the quasar redshift, two blueshifted and two redshifted).

Goal :

The aim is to detect galaxies with a high stellar formation rate around quasars, in order to check if quasars with a high UV luminosity suppress the stellar formation around them as suggested by recent observations with the TTF on the AAT (Barr et al. 2004 et Francis & Bland-Hawthorn 2005).

If such an observation is confirmed, it will put strong constraints on the cosmological models.



AAT TTF observation in 6°A band at 3845°A of the field of an extremely powerful QSO at  $z \sim 2$  (Francis & Bland-Hawthorn 2004).

PKS 0424-131 is the bright source at the centre of the field. The field is 400" east-west and 235" north-south, a subset of what will be possible with the 3D-NTT.

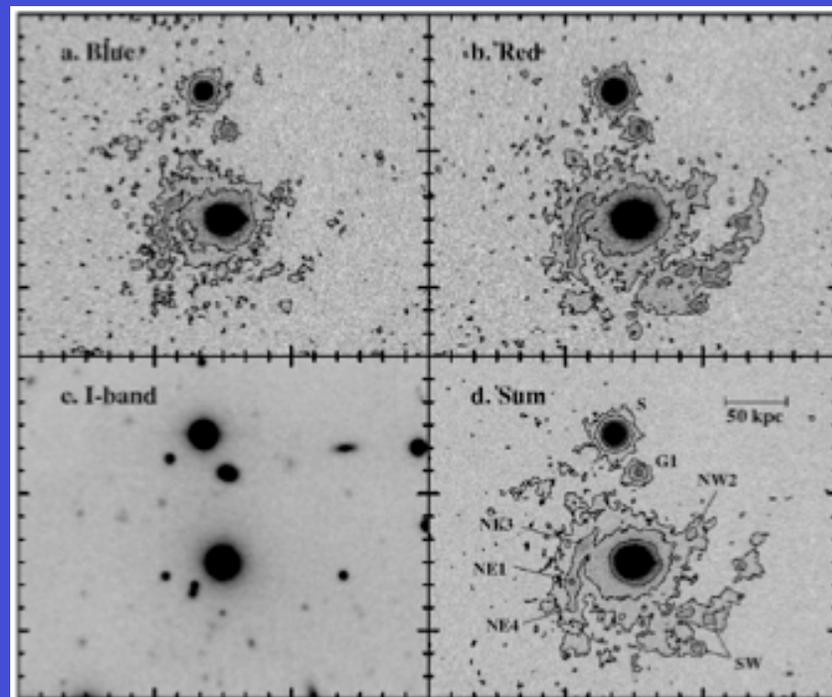
The other sources in the field are not associated with the QSO, and we did not detect any line emitting sources at the redshift of this extremely powerful UV source. This is highly unusual for lower power quasars (e.g. Barr et al 2004; Baker et al 2001).

### Example of a quasar field detection with the TTF at the AAT

In stark contrast to top picture, a huge (250 kpc) ionized  $H\alpha$  nebula was discovered about MR 2251-138, a low-redshift quasar with a lower intrinsic UV flux.

(a) and (b) are red and blue shifted, narrow band images, (d) is the sum of these; (c) is an R band image of the field. The field is 180" in size.

The nebula is thought to be shock-excited due to gas accreting onto the QSO host in one or more mergers.



# Required technical specifications

- Large programme "Galaxies" :

Mode : Tunable Filter mode only

Field of view : 15 x 15 arcmin or larger

Lines of interest :

[OII] 372.7 nm

H beta 486.1 nm

[OIII] 495.9-500.7 nm

[NII] 654.8-658.4 nm

H alpha 656.3 nm

Spatial resolution : 1 arcsec or better (that is to say sampling better than 0.5 arcsec)

Sensitivity : 50% dqe minimum at 372.7 nm, 70% minimum for the other lines

- Large programme "QSOs" :

Mode : Tunable Filter mode only

Field of view : 10 x 10 arcmin or larger

Bandwidth : Typical bandpass 0.5 to 1.0 nm (15 min exposures in five consecutive bands, each observed three times in order to remove weak cosmic ray hits (strong CRs are easy) and to reach the required sensitivity)

Wavelength range : 380 to 400 nm (looking for Lyman alpha at  $z \sim 2.2$  to 2.3)

Spatial resolution : 2 arcsec or better (that is to say sampling better than 1 arcsec)

Sensitivity : The typical surface brightness to reach is  $4 \times 10^{-19}$  erg cm<sup>-2</sup> s<sup>-1</sup> arcsec<sup>-2</sup> (according to previous observations with the TTF for this type of observation).