A red quasar with two lobes of radio emission extending from a central galaxy. The lobes are bright yellow and orange, fading to red and then black as they extend outwards. The central galaxy is a small, bright yellow and orange spot.

Exploring the higher resolution radio properties of red quasars

Vicky Fawcett

Lizelke Klindt, David Alexander, David Rosario,

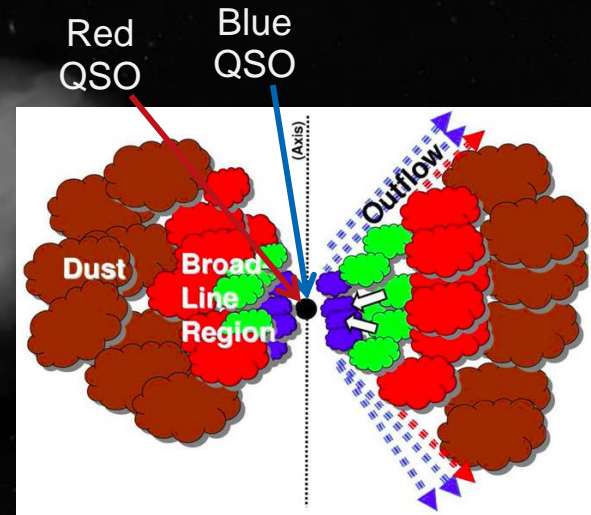
Sotiria Fotopoulou, Elisabeta Lusso

Centre for Extragalactic Astronomy

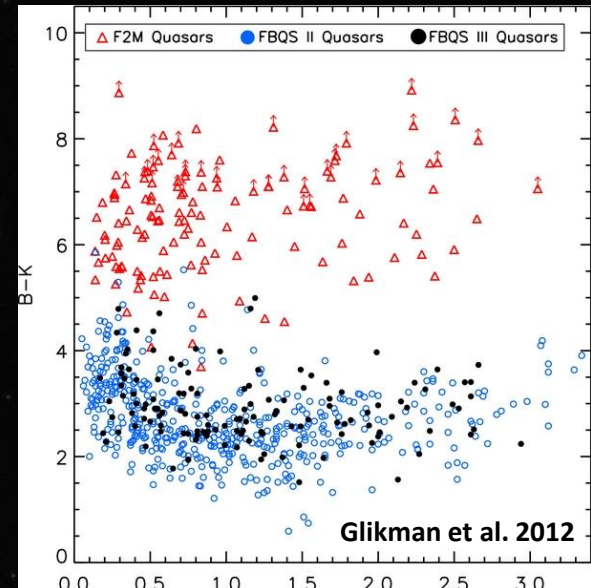
Durham University

Red quasars (rQSOs)

- The majority of the quasar population have blue optical colours, typically due to an unobscured view of the accreting super-massive black hole
- A fraction (of order $\sim 10\%$) are red at optical wavelengths
- This typically indicates that the accretion disc is obscured by a column of dust which extinguishes the shorter-wavelength blue emission



Orientation model
Gaskell, Klimek, & Nazarova (2007)



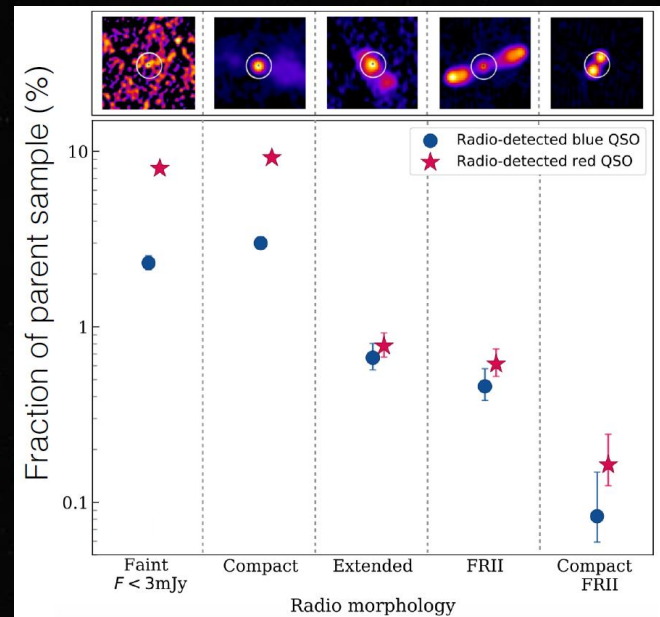
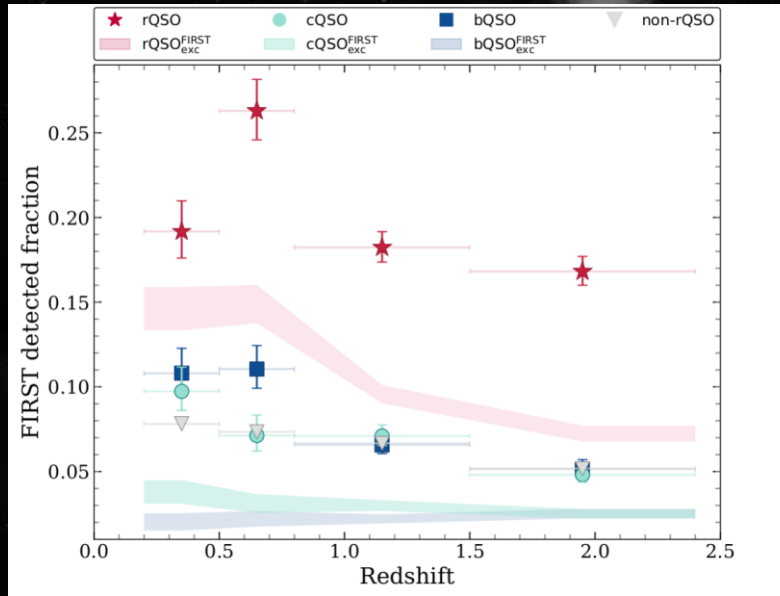
Radio differences of rQSOs

- Exciting new results from Klindt et al. 2019 show differences in the (FIRST: 5" resolution) radio properties SDSS rQSOs (carefully selected using the g-i colour)
- Cannot be explained by a simple orientation model
- Results are not due to selection or luminosity effects



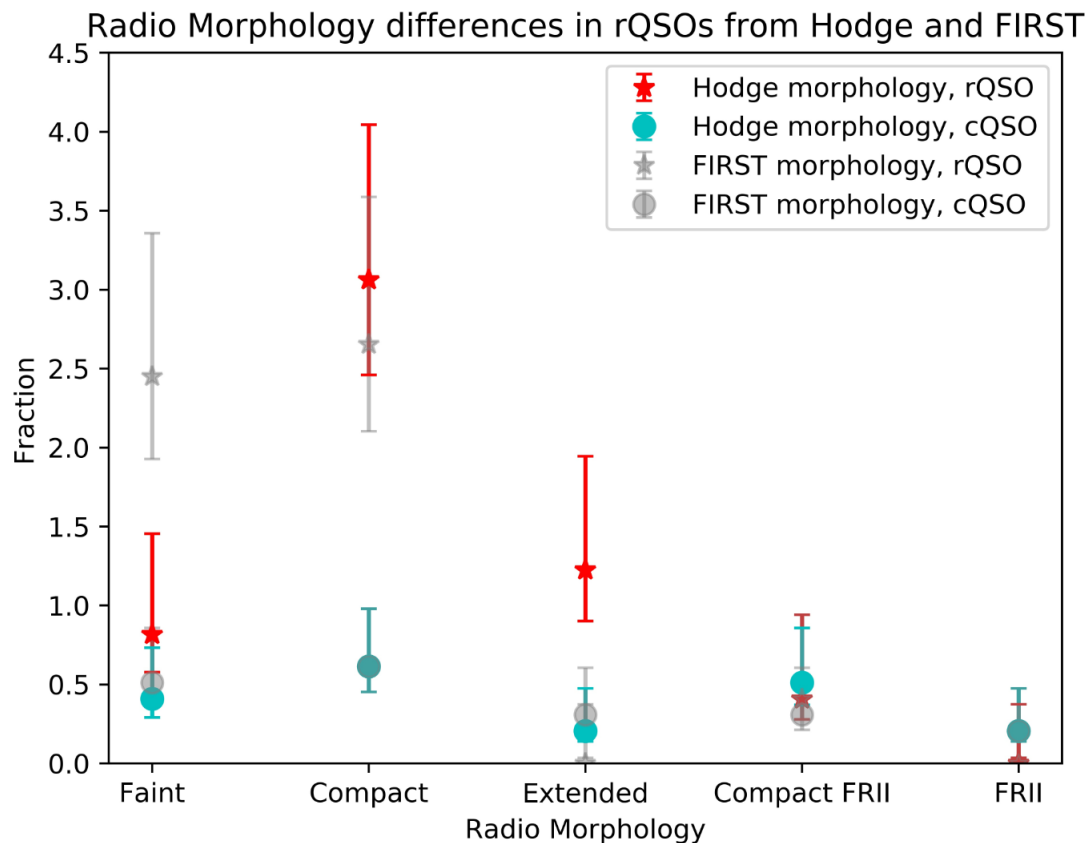
Lizelke Klindt

Klindt et al. 2019
(submitted)



Higher resolution data

- Higher resolution (1.8") Stripe 82 radio data from Hodge et al. 2011
- Sample taken from SDSS quasar catalog
- Radio detection result holds for larger sample & higher resolution
- Resolve smaller scale structures (order of ~10-14 kpcs)



Radio morphologies

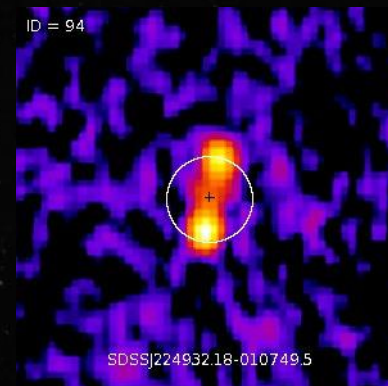
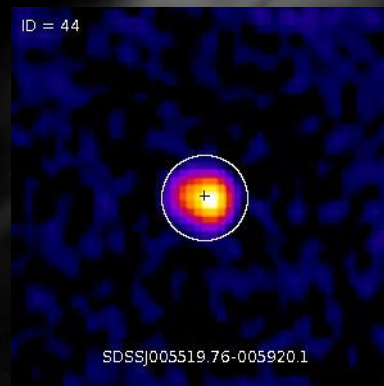
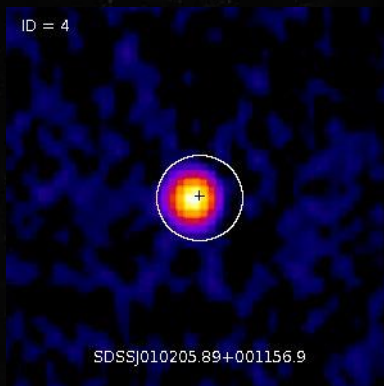
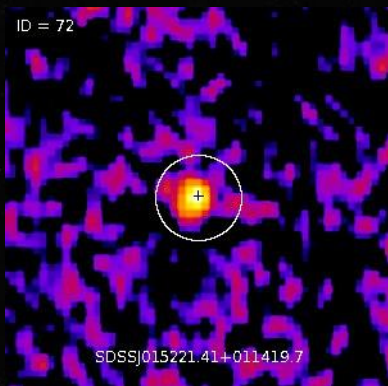
Faint

Compact

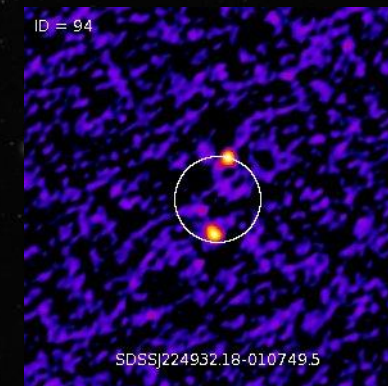
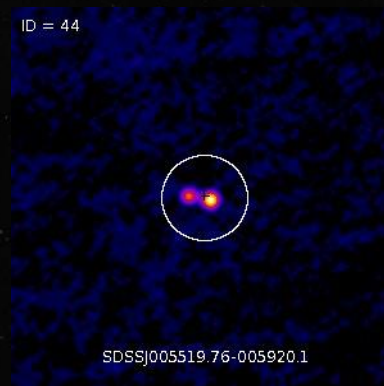
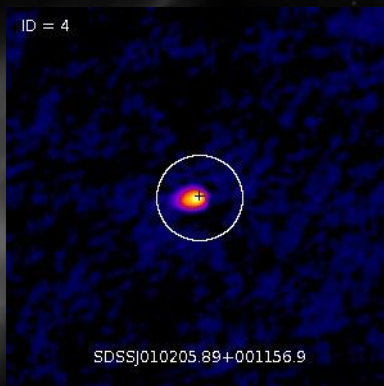
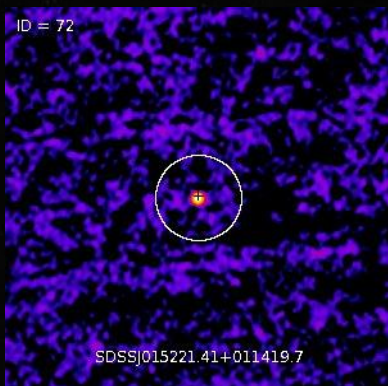
Extended

FR II

FIRST



VLA Stripe
82 (Hodge
et al. 2011)



Summary

- Found differences in the radio properties of red quasars which cannot be explained by a simple orientation model
 - This is not due to selection or luminosity effects
 - Red quasars appear to be fundamentally different to typical quasars
- Starting to resolve down to a scale on which these differences occur
- Future work
 - Differences in radio spectral slopes of red quasars
 - Quantify the extension of red quasars
 - Radio image stacking