

Determination of the Torus Size in Cen A

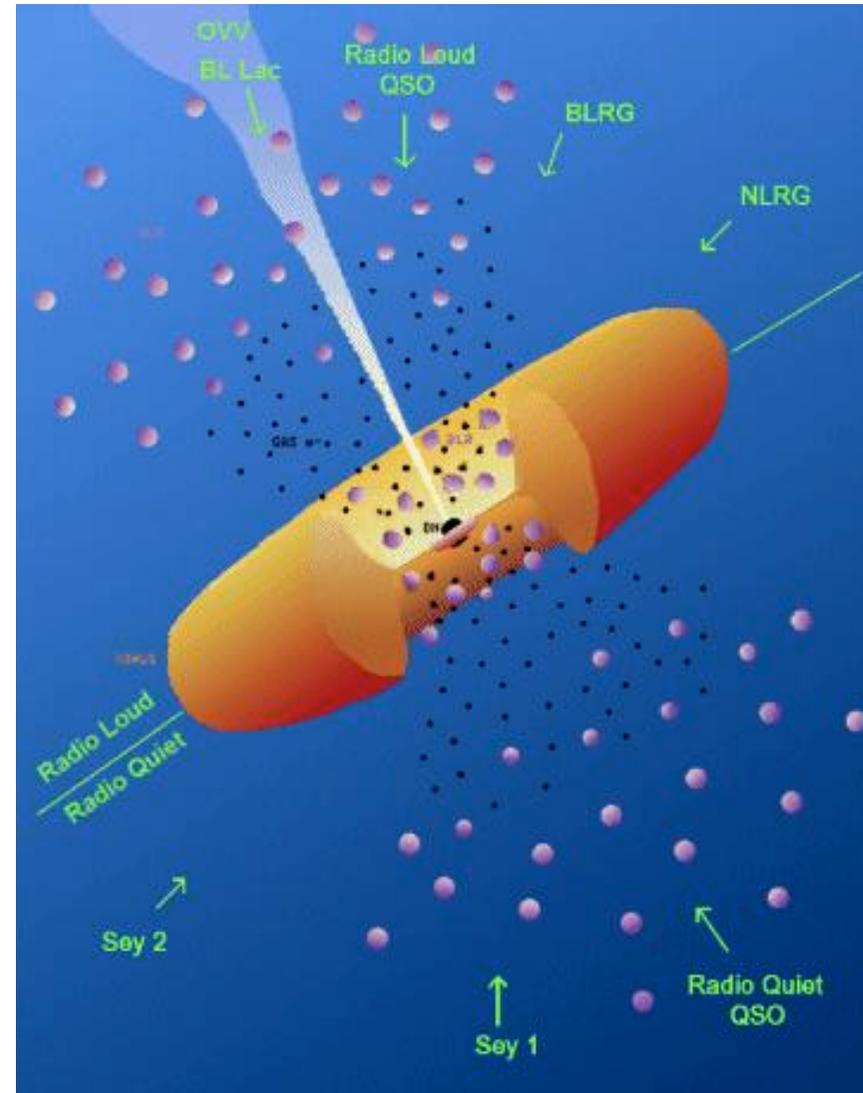
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The Unified Model and its problems

The UM is unable to explain part of the differences seen in object types:

- Morphological differences (Sy2s tend to be in later type galaxies Than Sy1s)
- Large variations in X-ray column densities from object to object.
- Type transitions like that of NGC 7582 (change in extinction optical depth or a SN event?)

Problems related to the hypothesis of a uniform dust torus



Scientific Rationale

- NGC 5128 (Cen A) is a Southern and one of the closest and brightest active galaxies (at $10\mu\text{m}$ the nuclear flux is 1.1 Jy)
- The highest resolution achieved so far with 8m class telescopes was of about 0.20 arcsec, which corresponds to a projected size of about 4.5 pc
- VLTI has the capability to probe this object in a baseline of 130m, going down to resolutions of 0.020 arcsec and probing about 0.3 pc.

Objectives

- Probe in detail smaller structures which can correspond to the torus and the outskirts of the BLR
- Our approach: to cover the the UV plane (and so the nucleus) in detail with all possible UT configurations. We can further constrain models using information about the innermost jet direction, assuming them to be perpendicular to the torus (information on the jets can be obtained from VLBA studies).

Observational Set-Up

- UTs + MIDI, centered in $10\mu\text{m}$ (N band)
all possible baselines (from 46 to 130m)
- HIGH_SENS mode with PRISM dispersion
- MIDI's limiting flux in this mode is 1 Jy, so appropriate for Cen A
- Best date to observe: April 15th until 17th (the source can be observed above 30° of elevation during the night, with total coverage by the baselines)

Expected Results

- Imaging of the nuclear region of Cen A, deriving the torus size (directly from imaging reconstruction or applying a simple model)
- Study of the extinction through the silicate absorption in high spatial resolution observations (a patchy torus?)
- Models for the torus can be constrained using dust temperatures derived from the spectra in different regions.