



# Infrared Variability of Active Galactic Nuclei

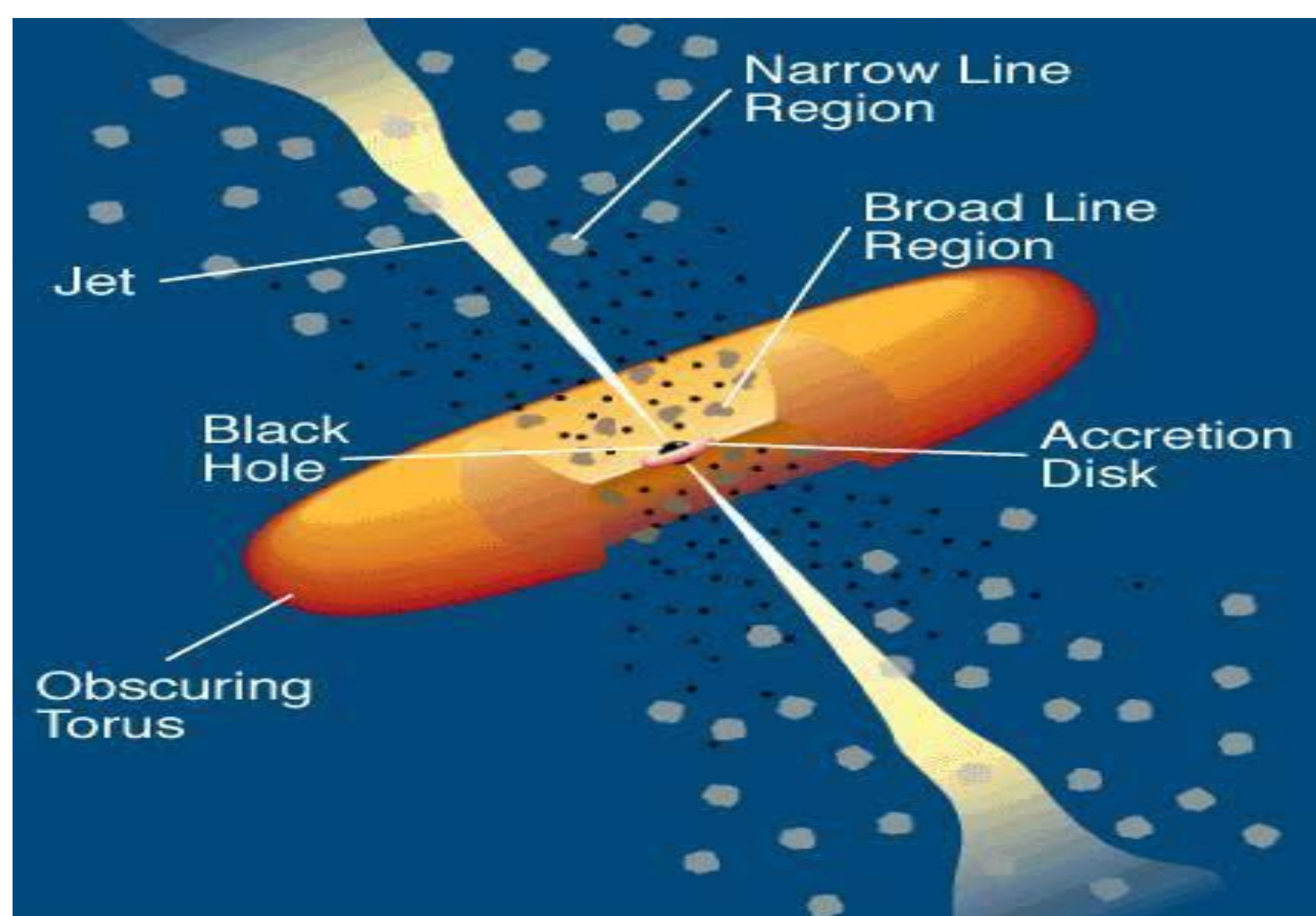
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## Abstract

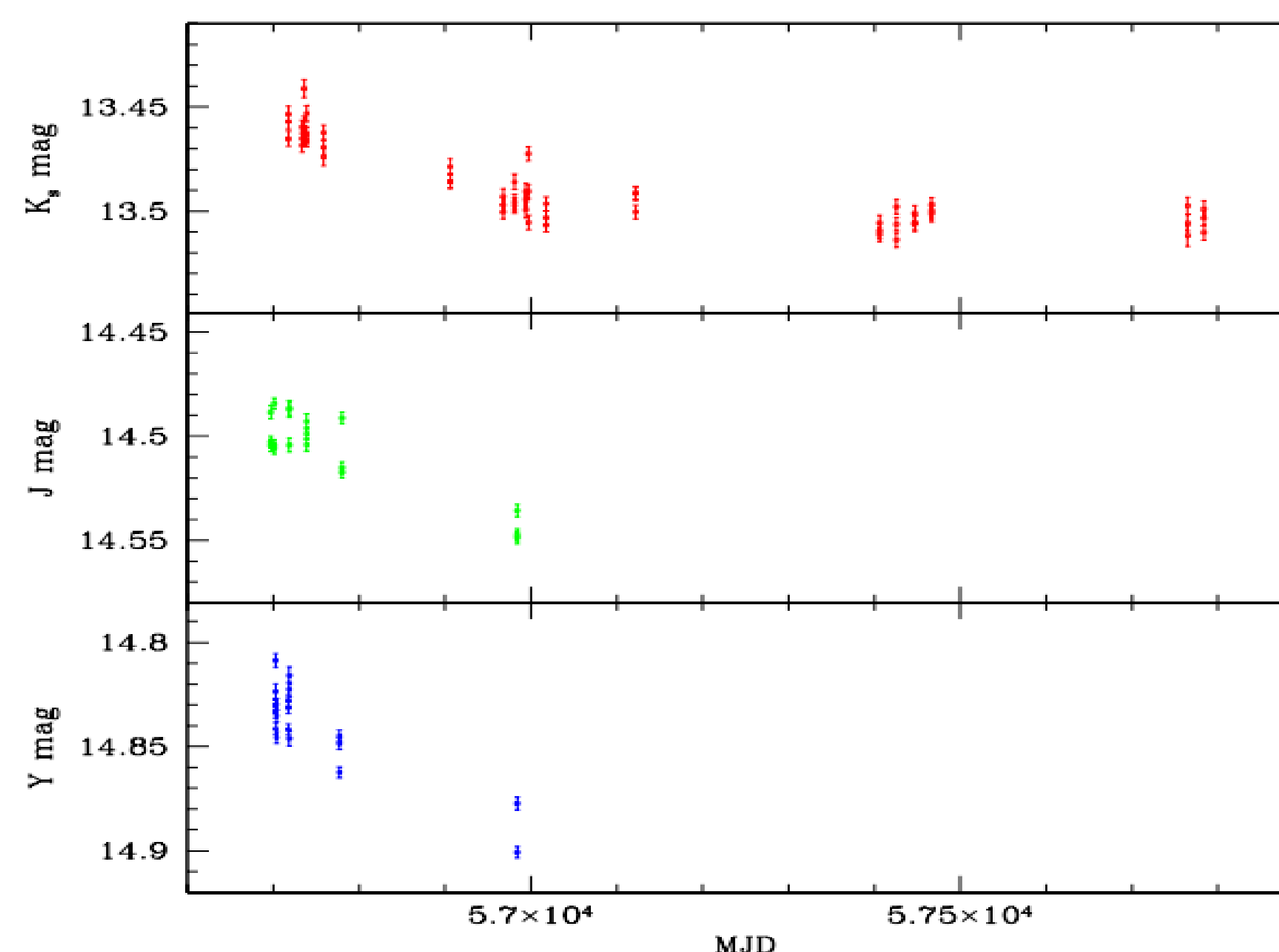
In this study, we used the high sensitivity and angular resolution of the VISTA Magellanic Clouds (VMC) multi-epoch survey at 1-2.5 micron as the basis for characterizing the variability of Active Galactic Nuclei (AGN) out to redshift  $>1$ . Two AGN, at redshifts 0.14 and 1 that are dominated in the infrared (IR) by emission from nuclear dust are studied in-depth, and the prevalence of IR variability is studied in a larger sample. We are using the hot dust (variability) as a tracer of accretion instabilities, but the dust grains are subjected to extreme conditions. The findings are placed in context of optical (OGLE) and mid-IR (Spitzer, WISE) variability studies and new radio data from the Australian SKA pathfinder to identify the causes for the near-IR variations.



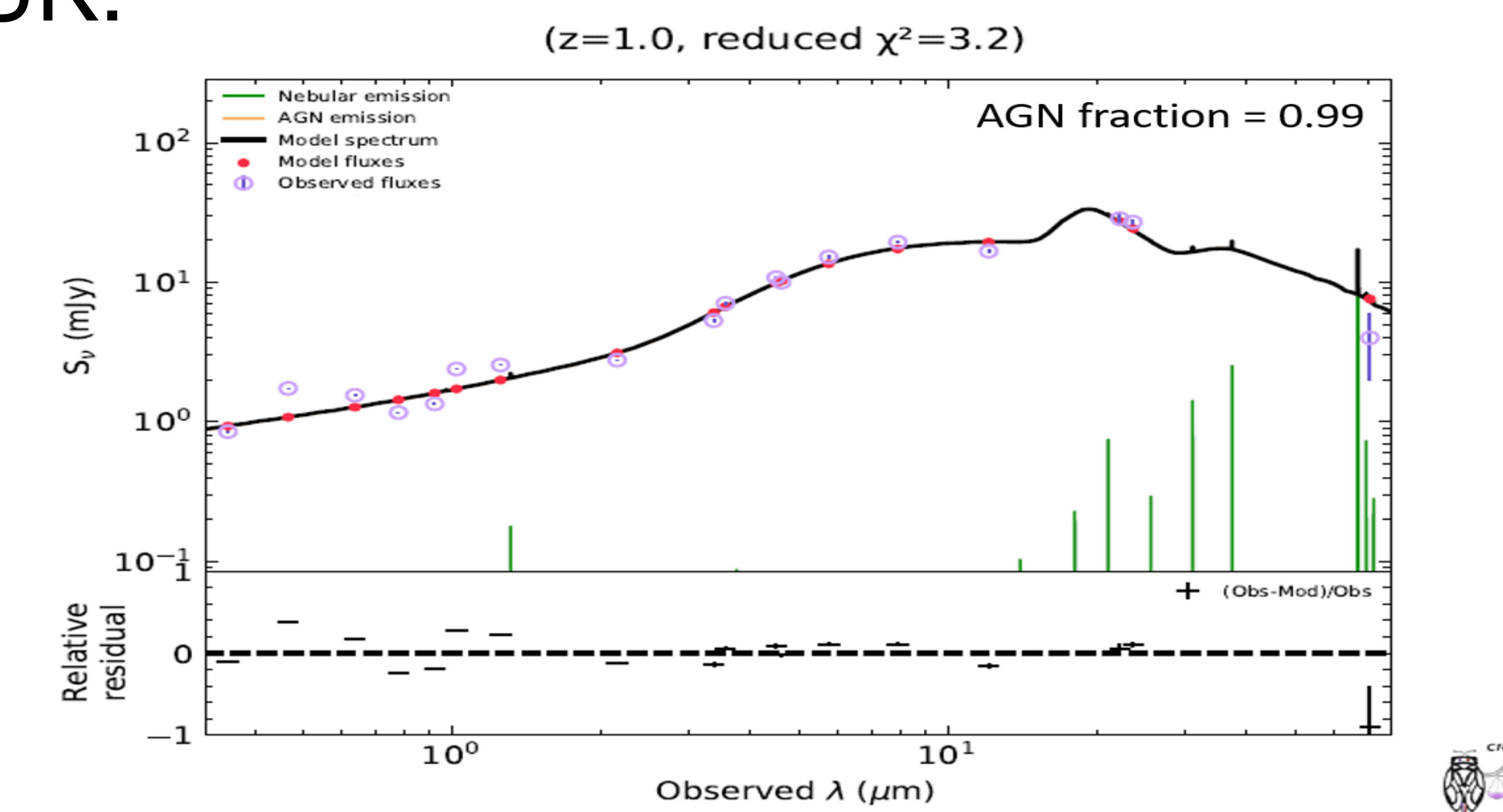
Credit: Urry & Padovani (1995)

## Initial Result

We retrieved the YJK measurements of an interesting source, SAGE0534AGN from the VMC survey of the VSA. It is an X-ray and Radio source. The light curve of this source was plotted to ascertain its variability.



*Near-IR light curve of SAGE0534AGN from the VMC*  
The lack of far-IR emission, and star formation, as well as silicate emission (which for SAGE0536AGN at  $z=0.14$  is one of the strongest Silicate emitters known), is what led us to believe we are looking at the central AGN without (or with very little) obscuration by the host galaxy, which agrees with our results as shown in the figure above.



*Spectral energy distribution of SAGE0534AGN (Pennock et al. (in prep)).*

The emission appears to be mostly AGN related. The orange line that represent AGN emission is not visible because it is completely under the black line.

## Future

African Large Telescope (SALTS) to find out more about this interesting source.



Credit: Southern African Large Telescope (SALT).

Credit: Adele De Witte/stock.adobe.com

## Conclusion

The source was bright at first and seems to have returned to slightly fainter stable phase. This confirms that the near-IR in this source is dominated by emission from hot dust close to the supermassive black hole.