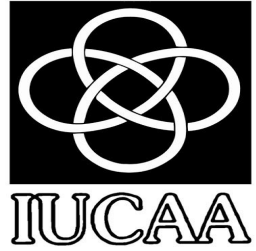




Unveiling the INOV of AGNs with the lens of ZTF



Presented by-

Divyanshi Sharma

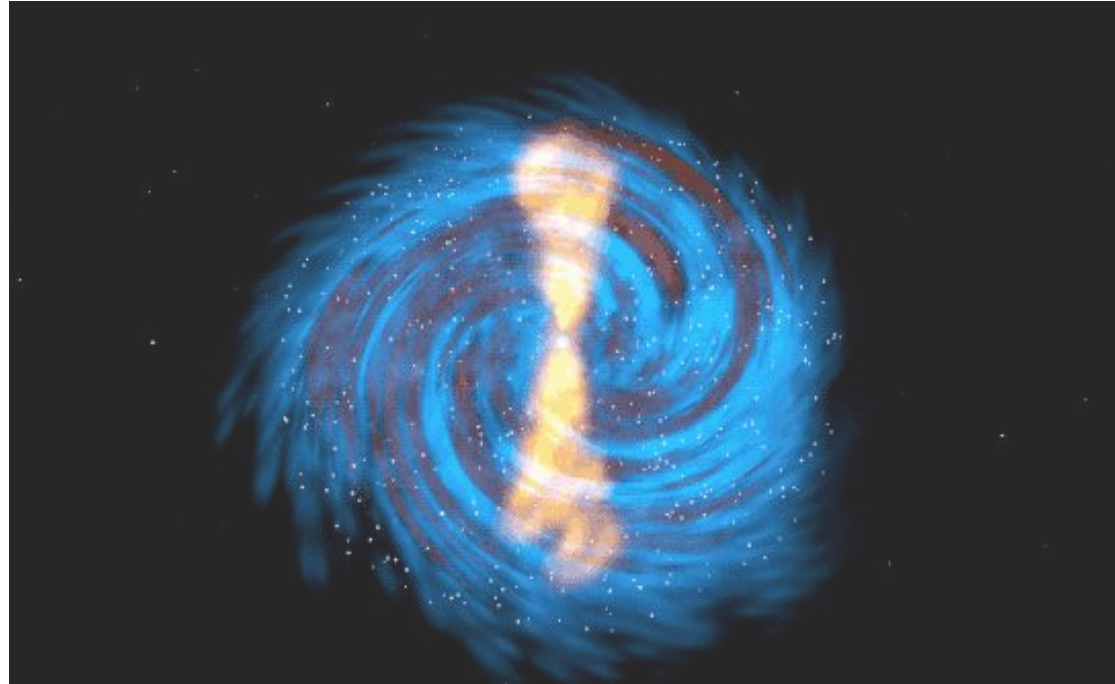
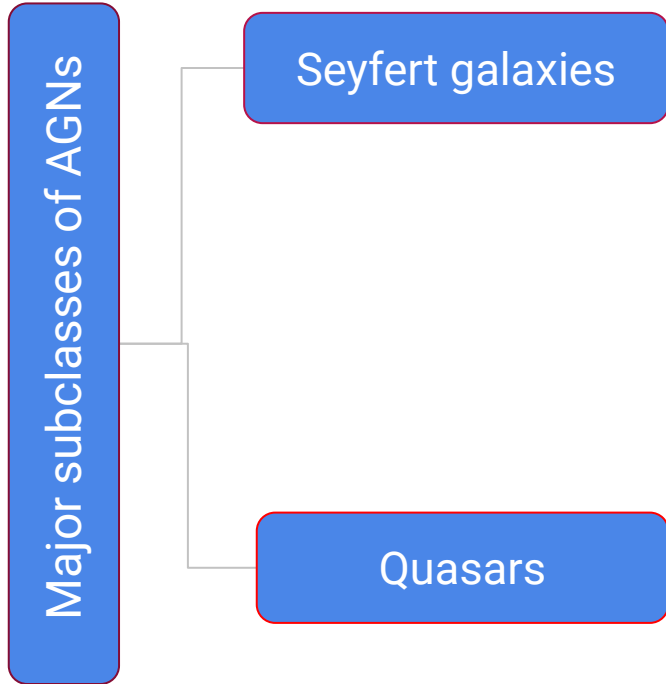
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Overview of AGNs

- Active Galactic Nuclei (AGN) are energetic regions at the centers of galaxies.
- They are powered by the accretion of mass onto supermassive black holes.
- AGNs are characterized by their extreme luminosity across various wavelengths.



Probing methods of AGNs

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graph TD; A[Probing methods of AGNs] --- B[Spectral analysis]; A --- C[Variability studies]; A --- D[X-ray and radio observations]; A --- E[Multi-messenger astronomy];
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Spectral
analysis

Variability
studies

X-ray and
radio
observations

Multi -
messenger
astronomy

INOV of AGNs

The optical flux variations of AGN on hour-like time-scales is known as micro-variability or Intra-night Optical Variability (INOV).

Importance of INOV studies:

1. Probing the Central Engine
2. Studying the Jet Physics
3. Understanding Disk Instabilities

Introduction to ZTF

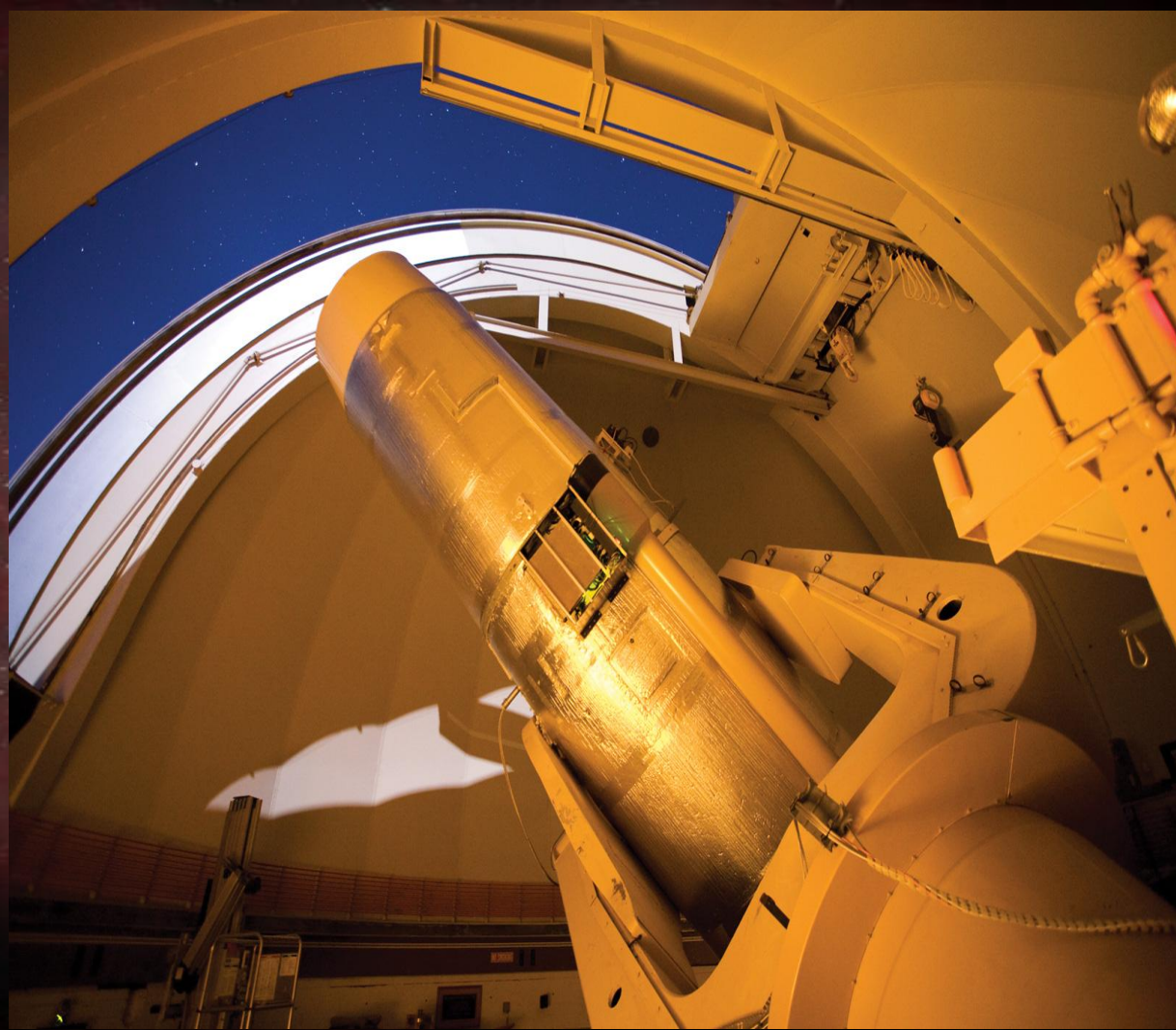
ZTF (Zwicky Transient Facility) is named after the Swiss astronomer Fritz Zwicky (1898 – 1974) who was Caltech's first astrophysics



From 1940's!

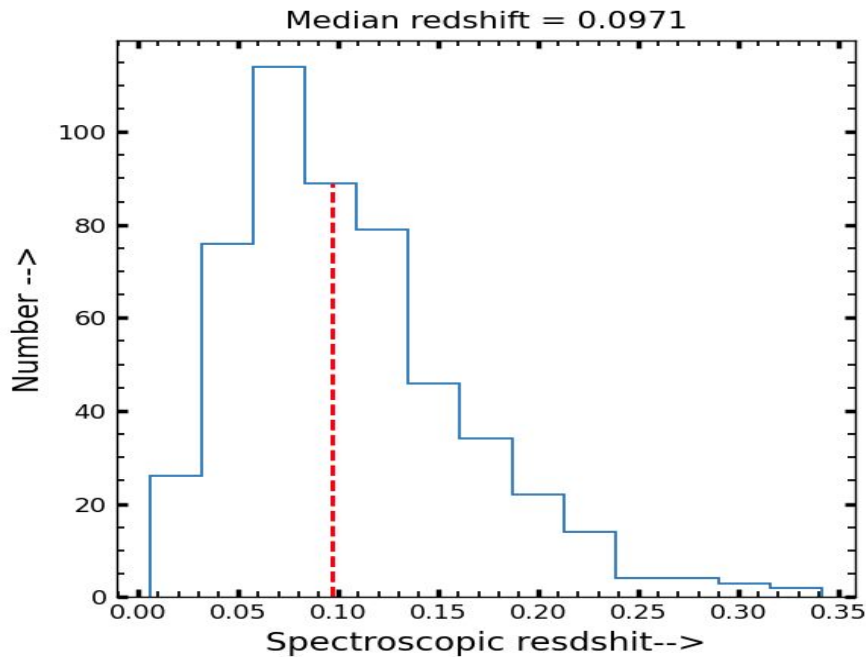
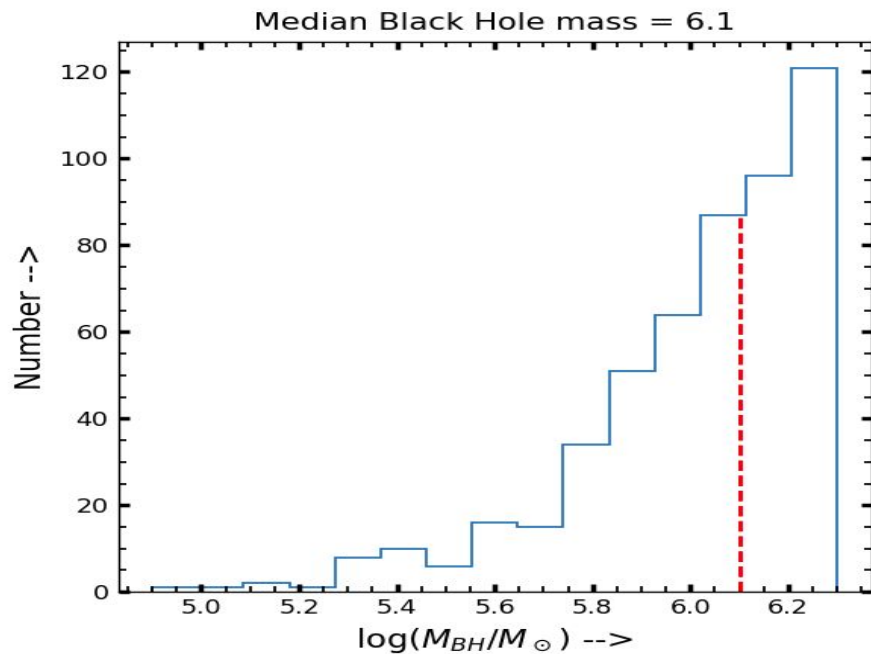
Instrumental features:

Field of view	47 sq. degrees
Detectors	16 6k ✖ 6k CCDs
Telescope	Samuel Oschin (48 inch)
Exposure time	30 sec
Readout time	10 sec
Filters	g, r and i



Sample Selection

- Dong et al. (2012) compiled 309 AGNs having Intermediate mass Black Holes from SDSS DR4 and He-Yang Liu et al 2018 compiled 204 such AGNs from SDSS DR7 totalling 513 such AGNs making it largest sample of AGNs harbouring IMBH till date.
- After filtering the sources based on the requirement of minimum 100 data points in the ZTF survey our final sample comprises of 418 sources.



Data selection

1. Discard data points with ZTF CATFLAG source of zero.
2. Reject all the sources having mean $m_r > 20$
3. Discarding the sessions with less than 10 data points.
4. Reject LCs of duration (T) less than 2 hours and having gaps of > 1 hour.

References

1. [<https://www.ztf.caltech.edu/>]
2. [<https://sites.astro.caltech.edu/palomar/about/>]
3. [B. M. Peterson. An Introduction to Active Galactic Nuclei. Cambridge University Press, 1997]

THANK YOU