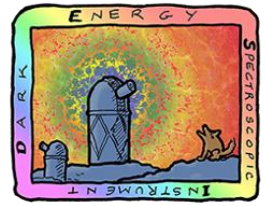
Changing-look AGNs in DESI

Wei-Jian Guo 郭威坚

2024/10/16

Tsung-Dao Lee Institute

Contents of Talk



Dark Energy Spectroscopic Instrument

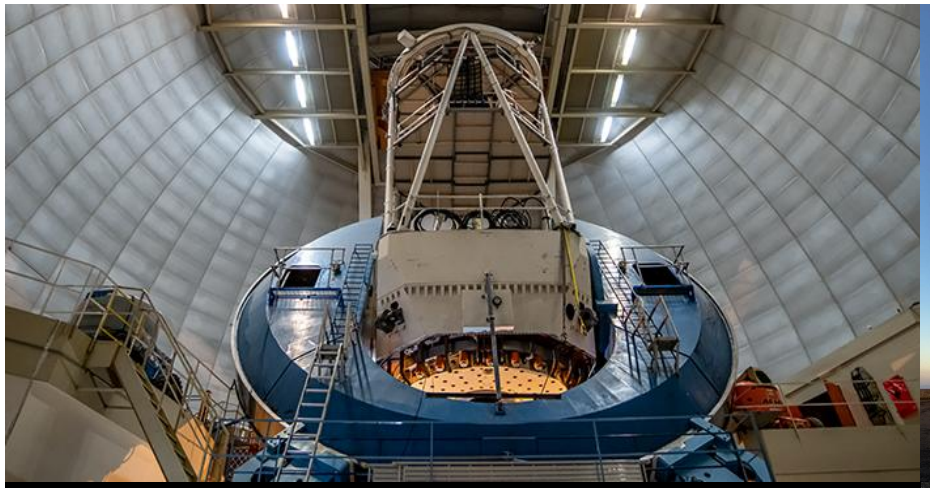
U.S. Department of Energy Office of Science

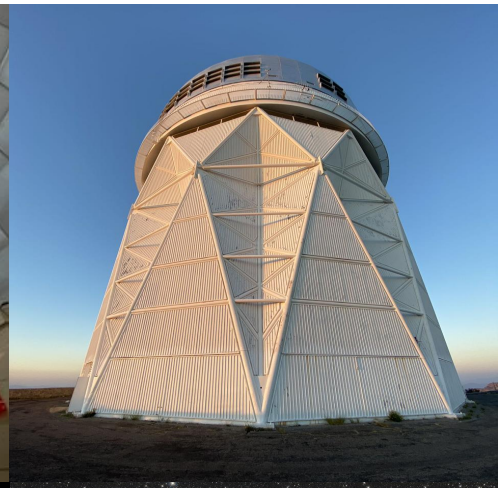
- DESI Survey and First Data Release
- CL-AGNs Research
- The CL-AGNs work in DESI
- Summary

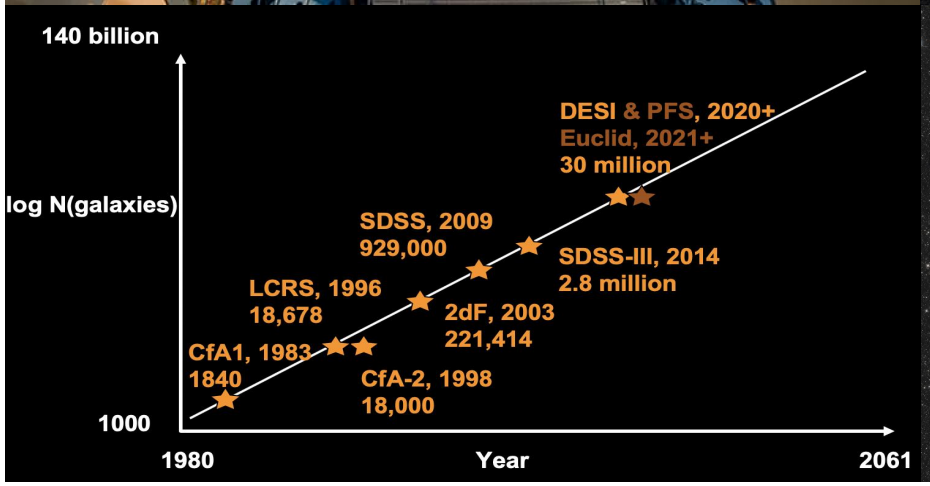
Dark Energy Spectroscopic Instrument (DESI)

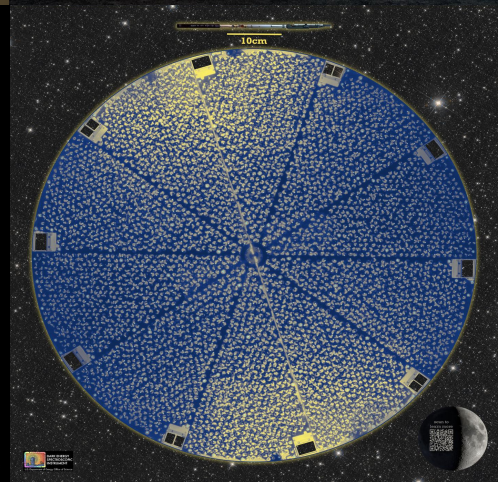
Dark Energy Spectroscopic Instrument

U.S. Department of Energy Office of Science









Stage IV dark energy measurement

Supported by the Department of Energy Office of Science

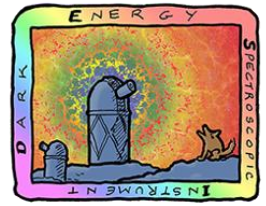
Mayall 4-meter telescope at Kitt Peak National Observatory

5000 Eyes: Mapping the Universe

Tens of millions optical spectra of galaxies and quasars

Wavelength:	Blue	$360 < \lambda \leq 555$ nm	Red	$555 < \lambda \leq 656$ nm	Infrared	$656 < \lambda \leq 980$ nm
Resolution :	Blue	$R = 2{,}000 \sim 3{,}200$	Red	$R = 3{,}200 \sim 4{,}100$	Infrared	$R = 4{,}100 \sim 5{,}000$

Contents of Talk



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Active Galactic Nuclei

Dark Energy Spectroscopic Instrument

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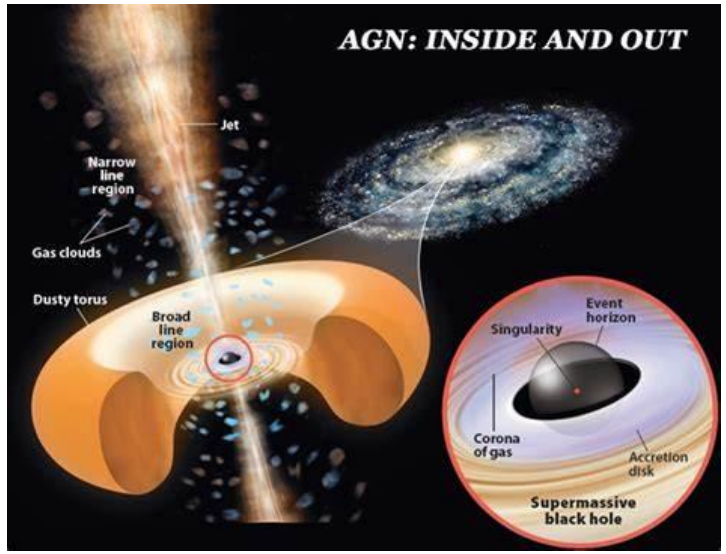
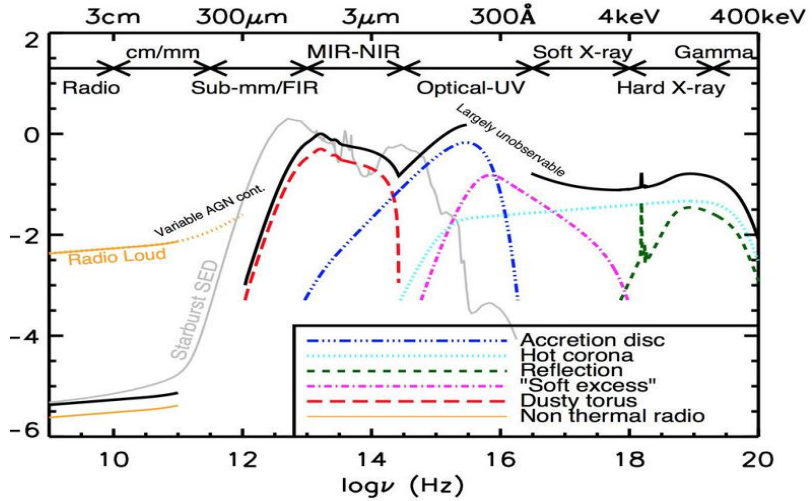
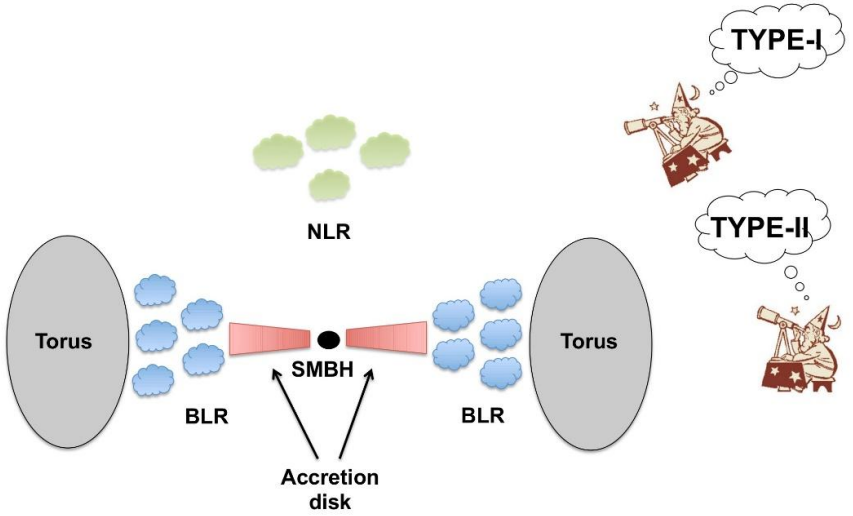
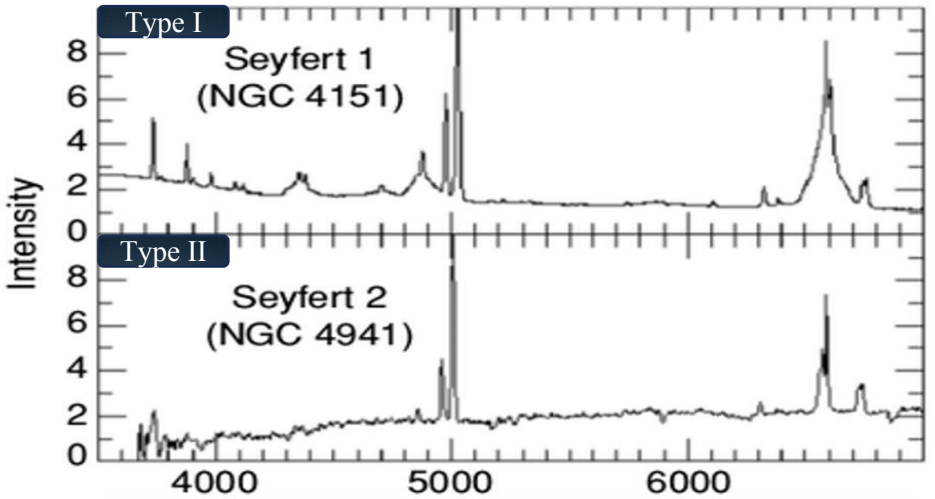
Observation





Unification Paradigm





AGN Evolution

Dark Energy Spectroscopic Instrument

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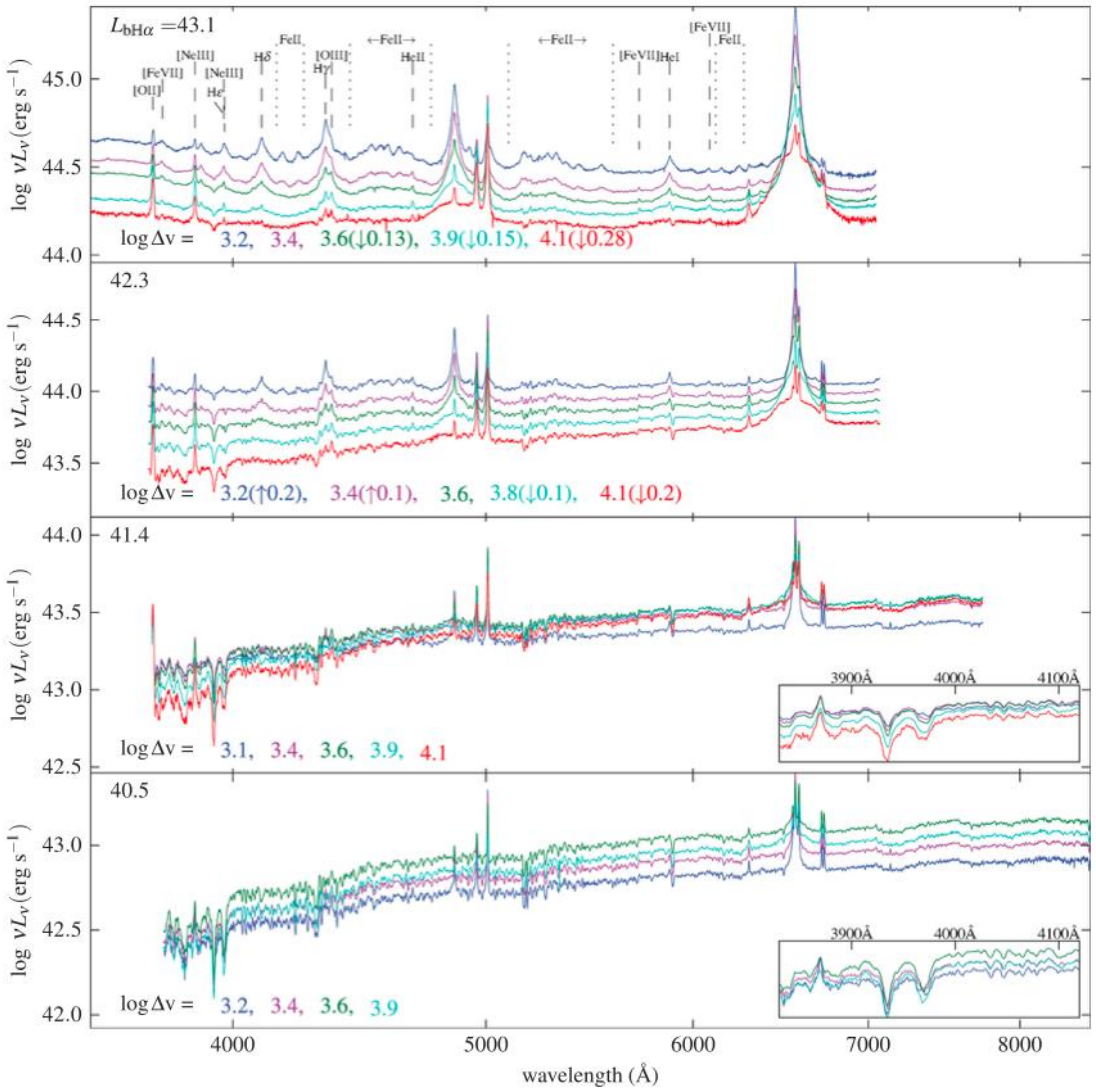
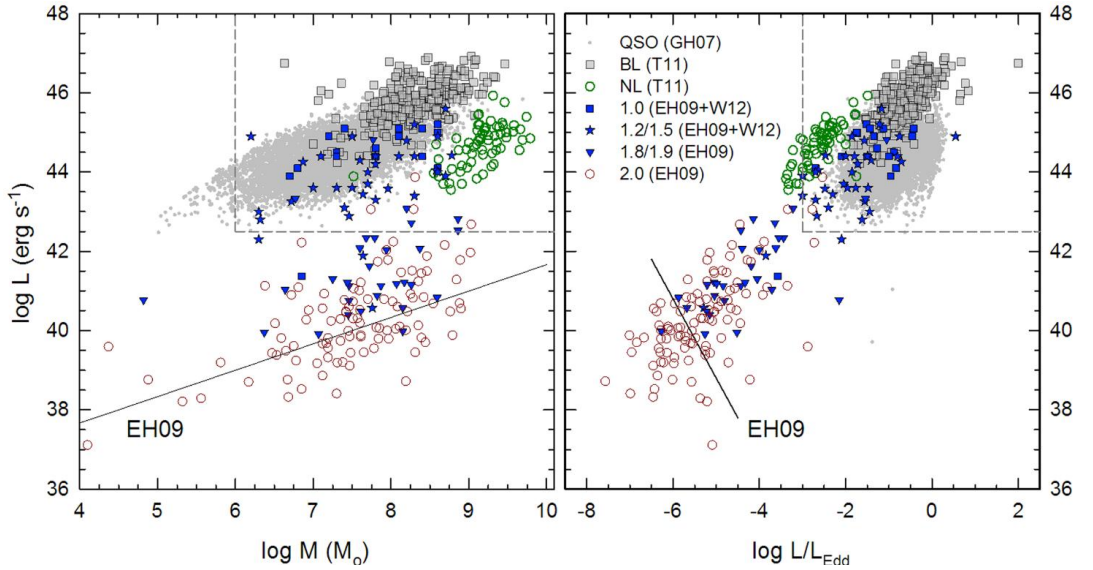
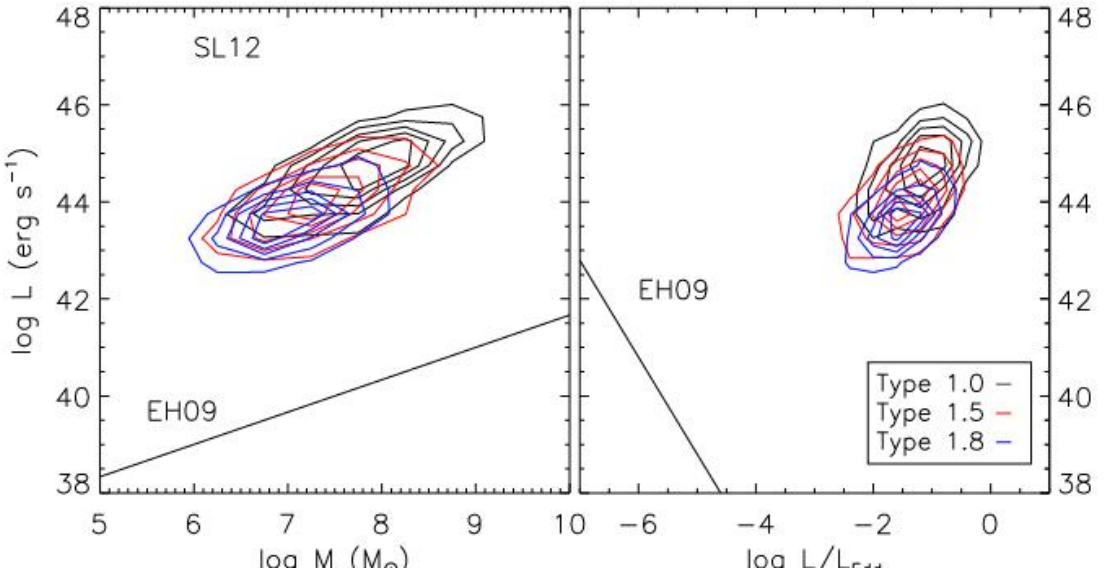
Stern & Laor 2012



Elitzur et al. 2014





Discover of the Changing-look AGN

Dark Energy Spectroscopic Instrument

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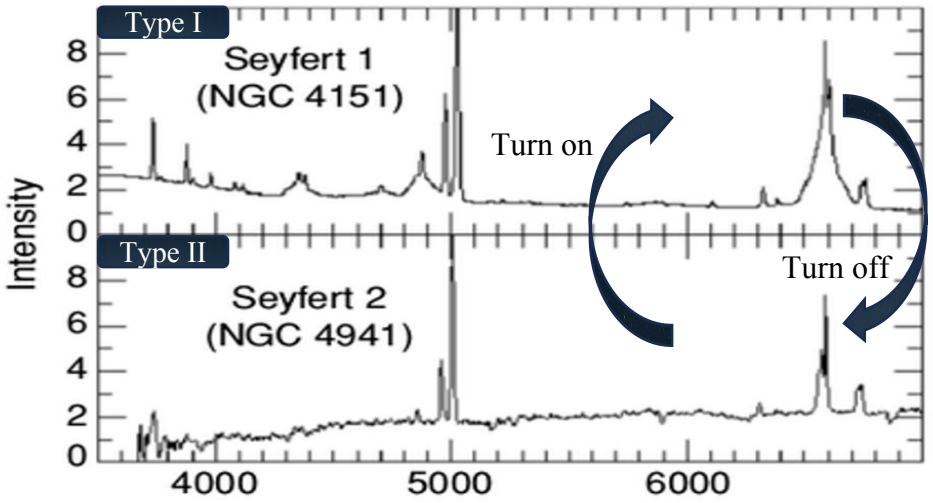
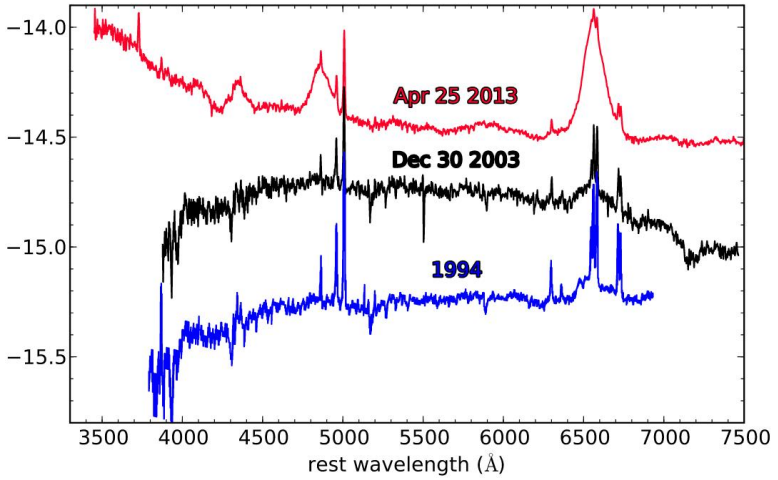
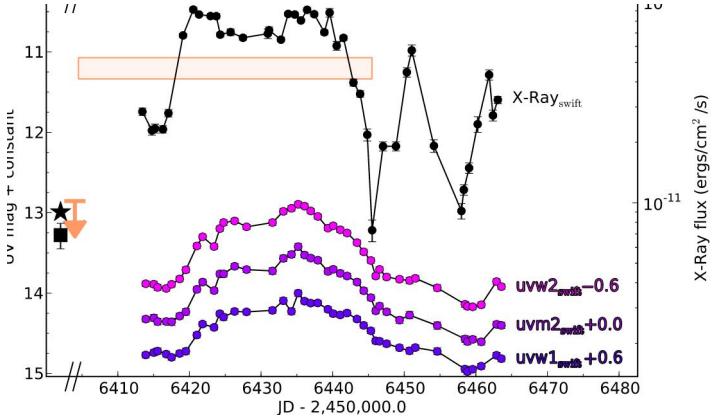
View Angle

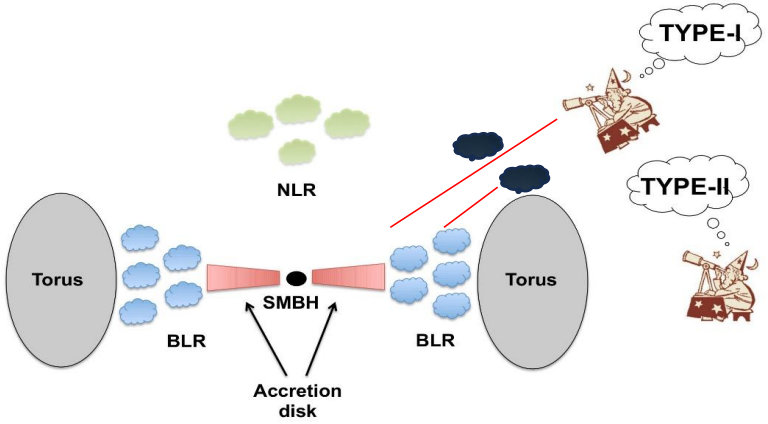


NGC 2617

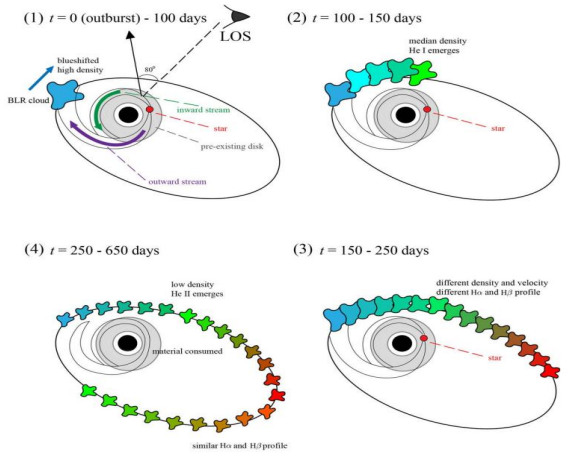




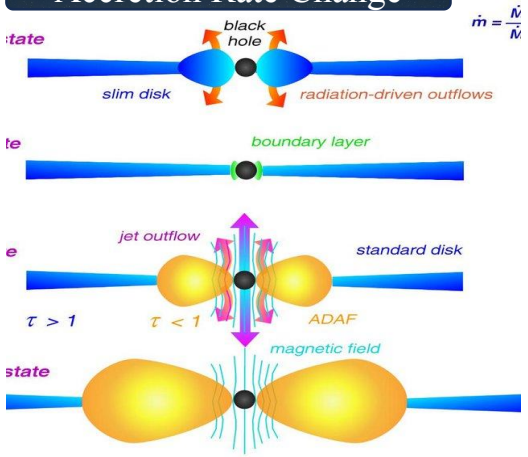
Obscured by Clouds



Tidal Disruption Event



Accretion Rate Change



DESI CL-AGN project (PI: Wei-Jian Guo)

Dark Energy Spectroscopic Instrument

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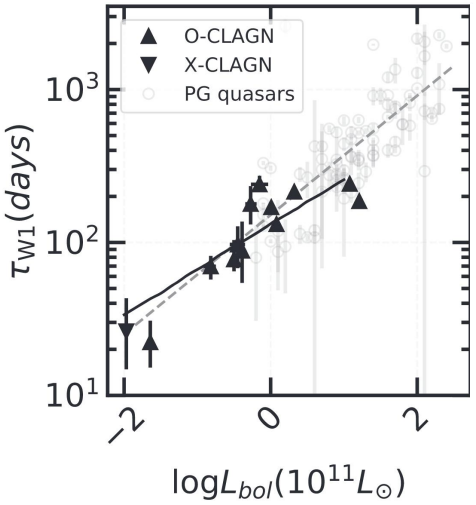
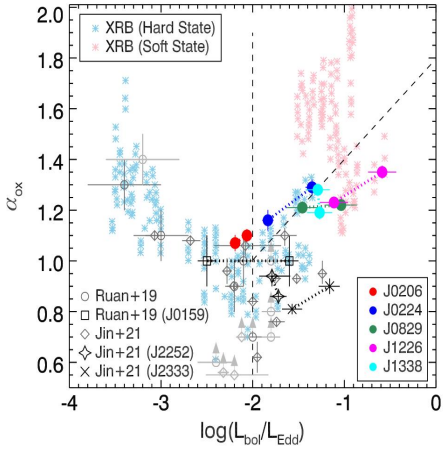
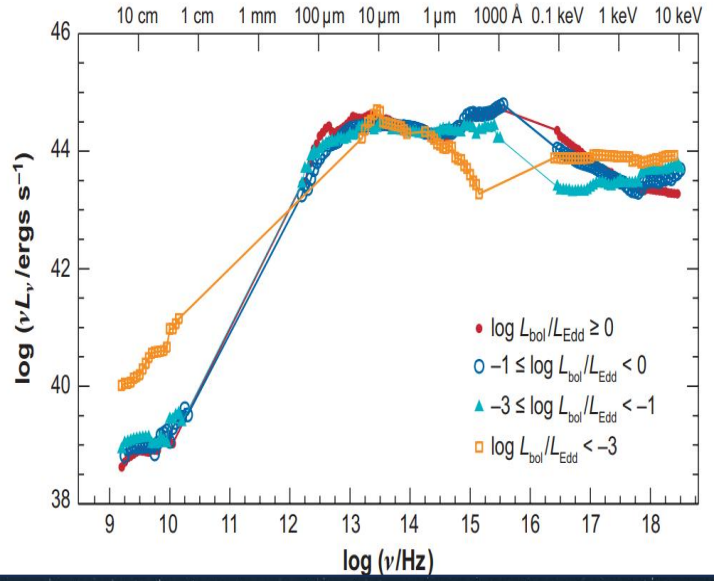
Mid-Infrared characteristic and torus properties
Data:WISE
Leader: GREENWELL, CLAIRE L. (Durham)





Search for the CL-AGN, statistical analysis, SED for CL-AGN
DESI collabration:
Wei-Jian Guo,David Alexander, Rahma Alfarsy, Rebecca Canning, Tamara Davis, Vicky Fawcett, Linhua Jiang, claire greenwell, Stephanie Juneau, John Moustakas, Zhiwei Pan, Ragadeepika Pucha, Małgorzata Siudek, Hu Zo

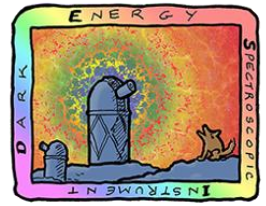
Radio characteristic
Data: FIRST and VLASS
Leader: Victoria Fawcett (Newcastle)
Zhi-qiang Cheng(NNU)



X-Ray characteristic
Data: eROSTA and Einstein Probe
Leader: Huaqing Cheng (EP) Stephanie Juneau (Noirlab) Wei-Jian

Host galaxy characteristic
Data: DESI SDSS WISE
Leader: Junjie Jin (NAOC) Shengxiu Sun (PKU)
Malgorzata Siudek (IFAS)

Contents of Talk



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CL-AGN Selection

Dark Energy Spectroscopic Instrument

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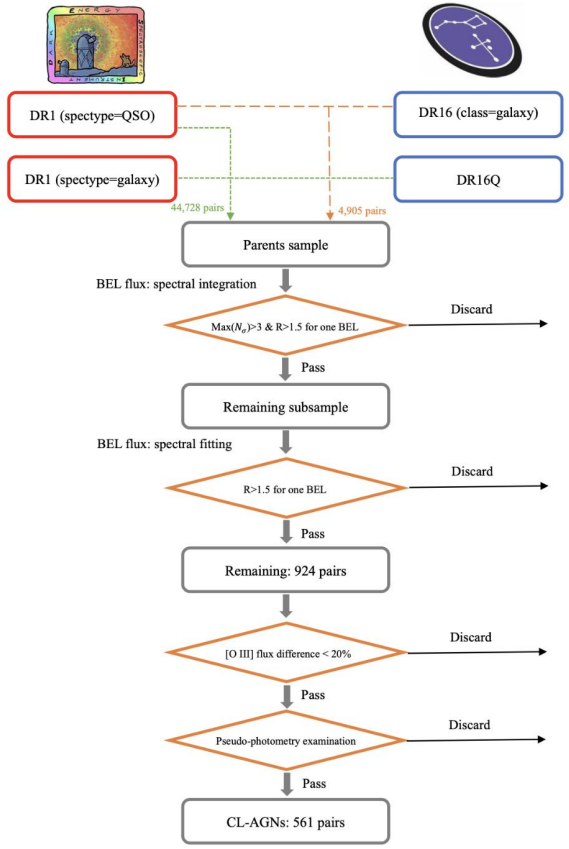
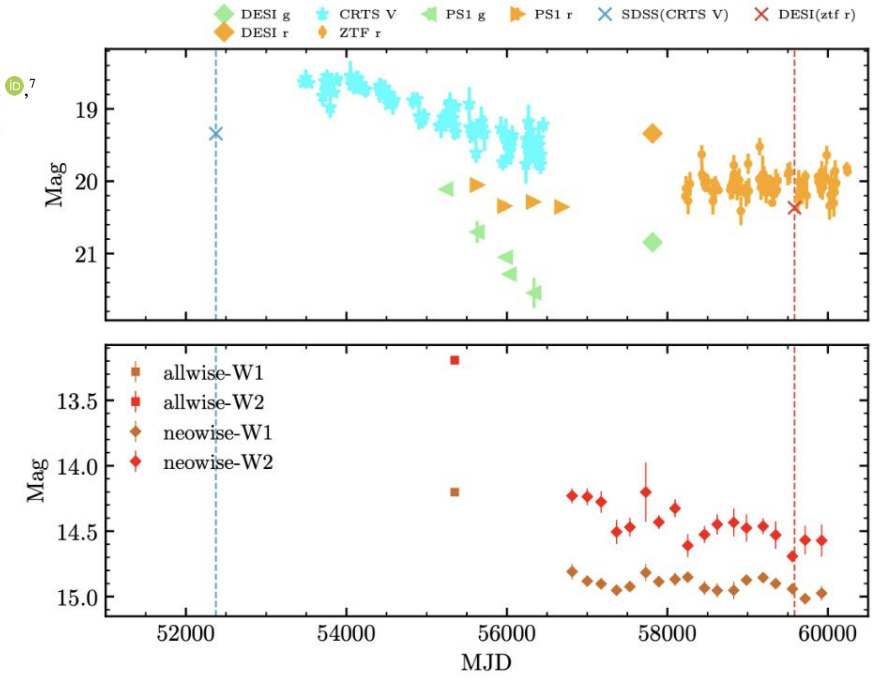
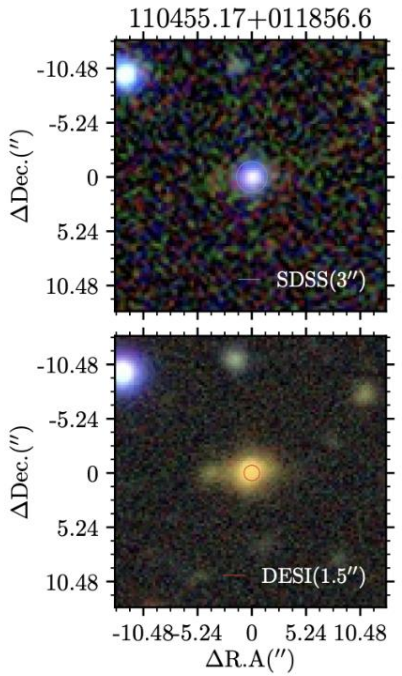
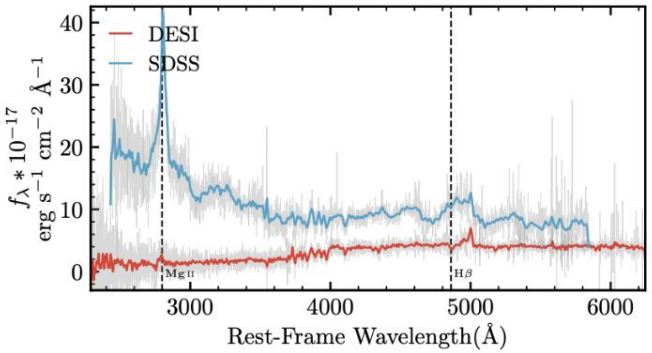
Changing-look Active Galactic Nuclei from the Dark Energy Spectroscopic Instrument. II. Statistical Properties from the First Data Release

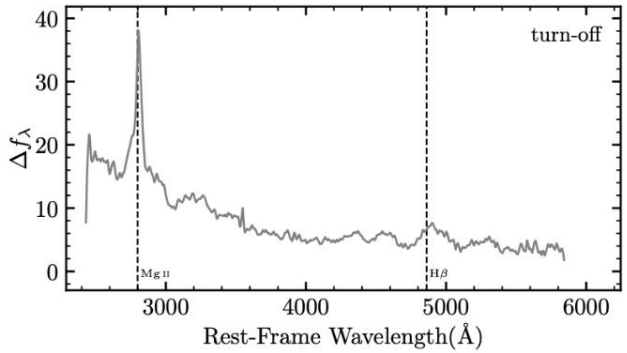
Wei-Jian Guo [1], Hu Zou [1], Claire L. Greenwell [2], David M. Alexander [3,2], Victoria A. Fawcett [4], Zhiwei Pan [5], Małgorzata Siudek [6], Jessica Nicole Aguilar [7], Steven Ahlen [8], David Brooks [9], Todd Claybaugh [7], Kyle Dawson [10], Axel de la Macorra [11], Peter Doel [9], Andreu Font-Ribera [9,12], Enrique Gaztañaga [13,14,6], Satya Gontcho A Gontcho [7], Gaston Gutierrez [15], Robert Kehoe [16], Theodore Kisner [7], Martin Landriau [7], Laurent Le Guillou [17], Marc Manera [18,12], Aaron Meisner [19], Ramon Miquel [20,12], John Moustakas [21], Francisco Prada [22], Graziano Rossi [23], Eusebio Sanchez [24], Michael Schubnell [25,26], David Sprayberry [19], Jipeng Sui [27], Gregory Tarlé [26], Benjamin Alan Weaver [19], Yun-Ao Xiao [27], and Siwei Zou [28,29]











Data:SDSS Fiber Drop!

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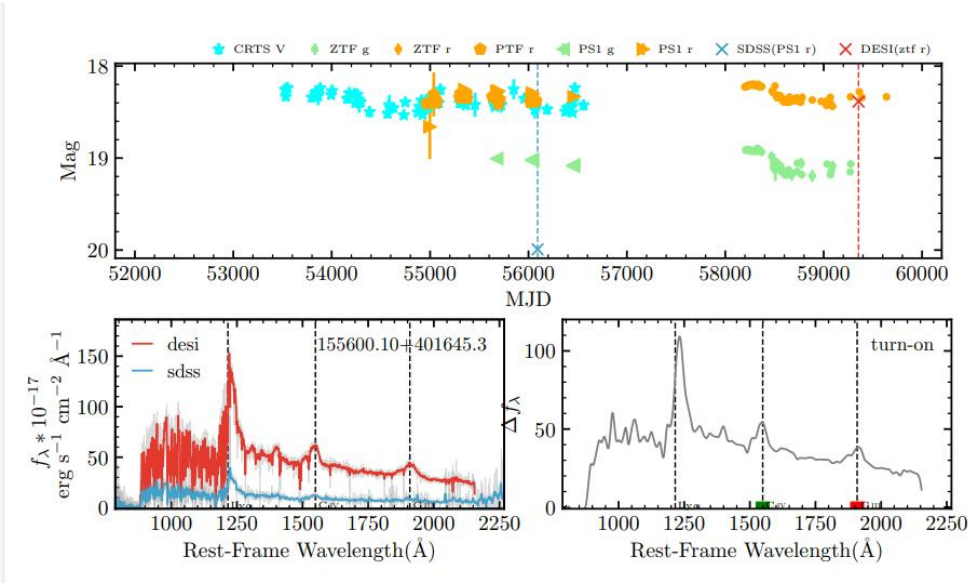
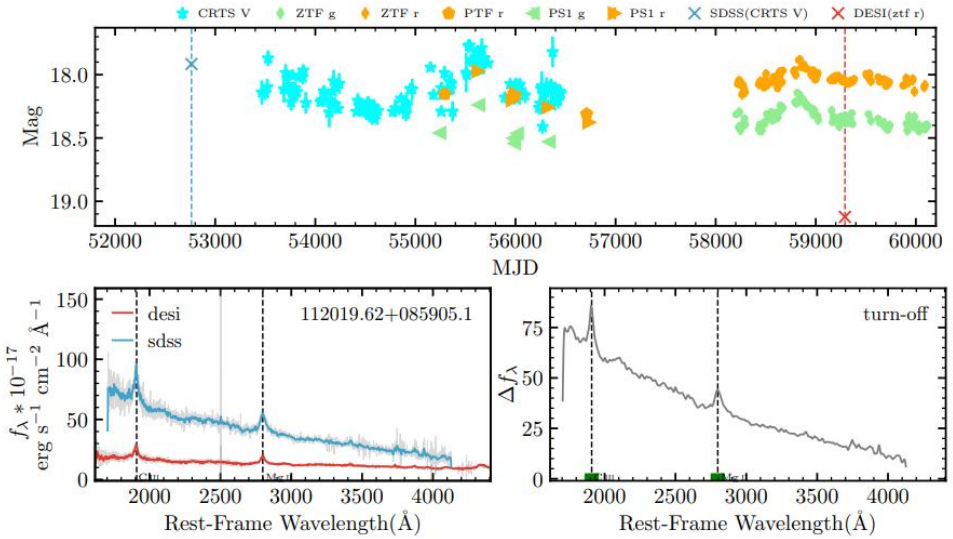
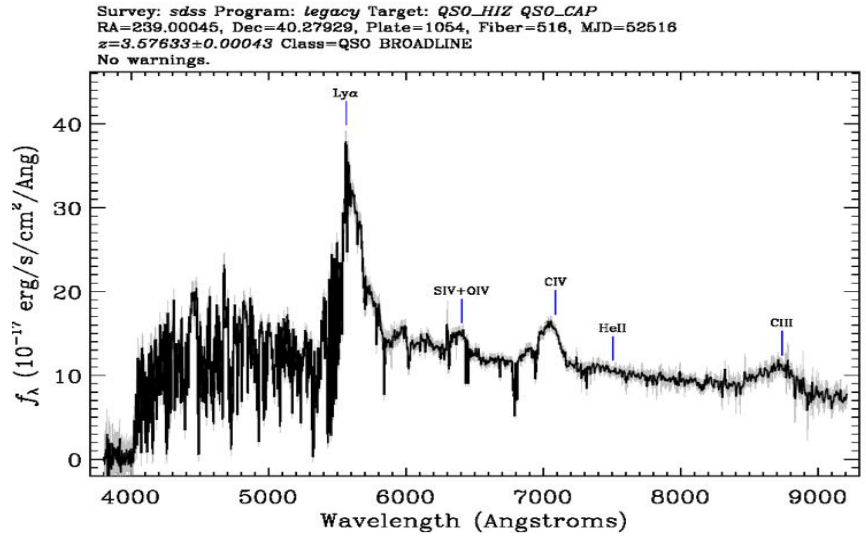
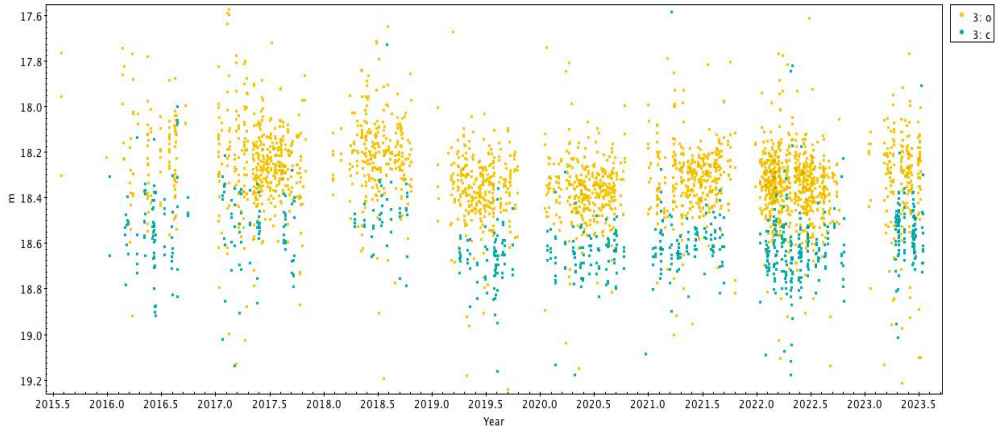
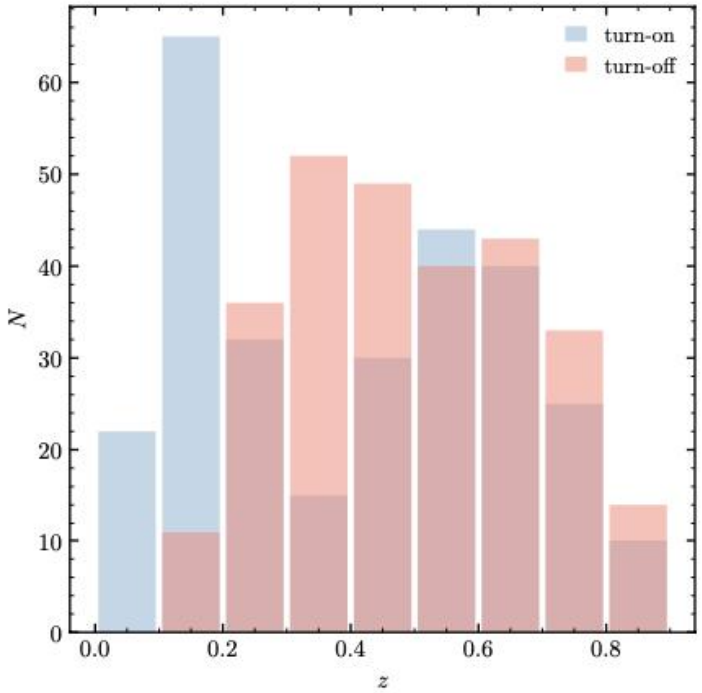


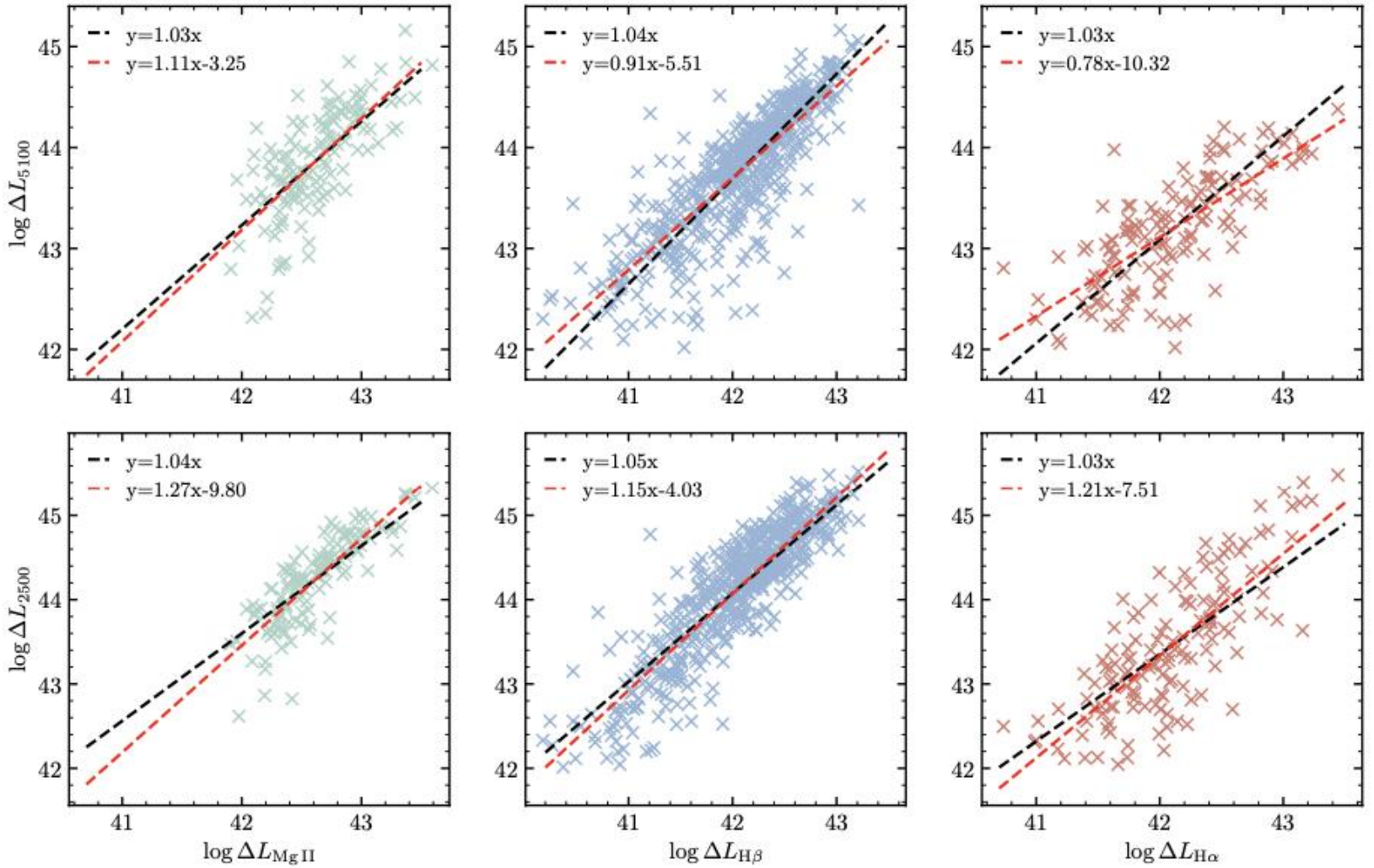






Statistical Results: basic behaviours





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Statistical Results: Broad Emission lines

Dark Energy Spectroscopic Instrument

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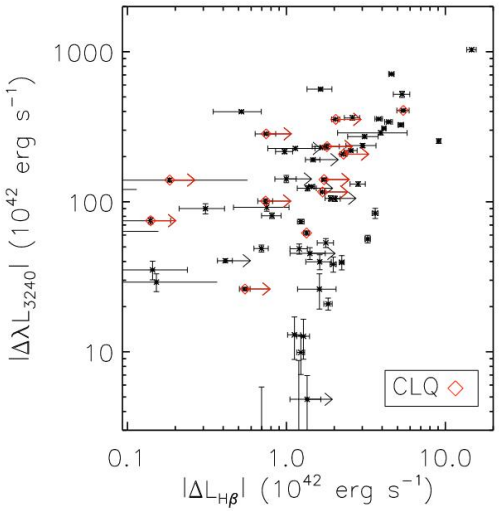
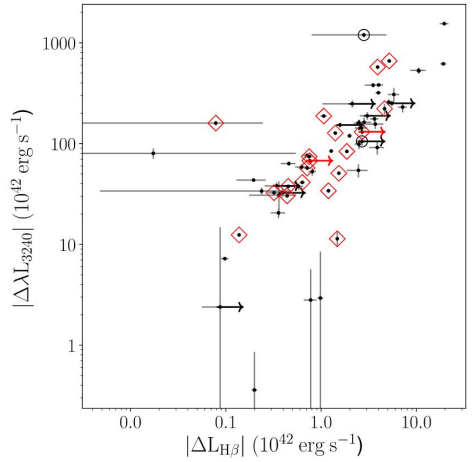
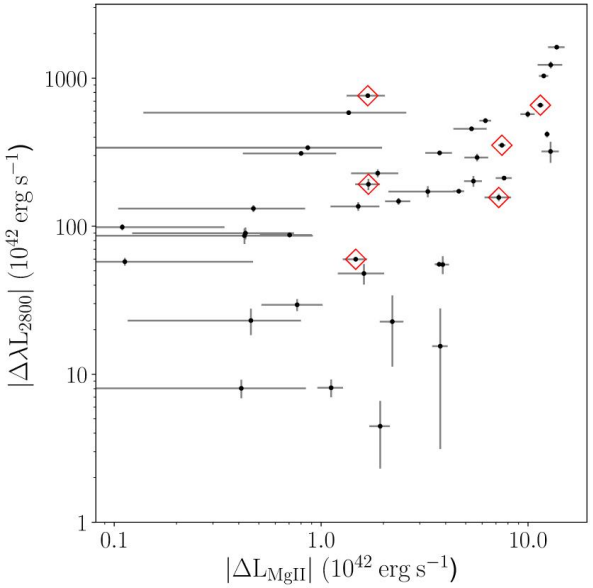
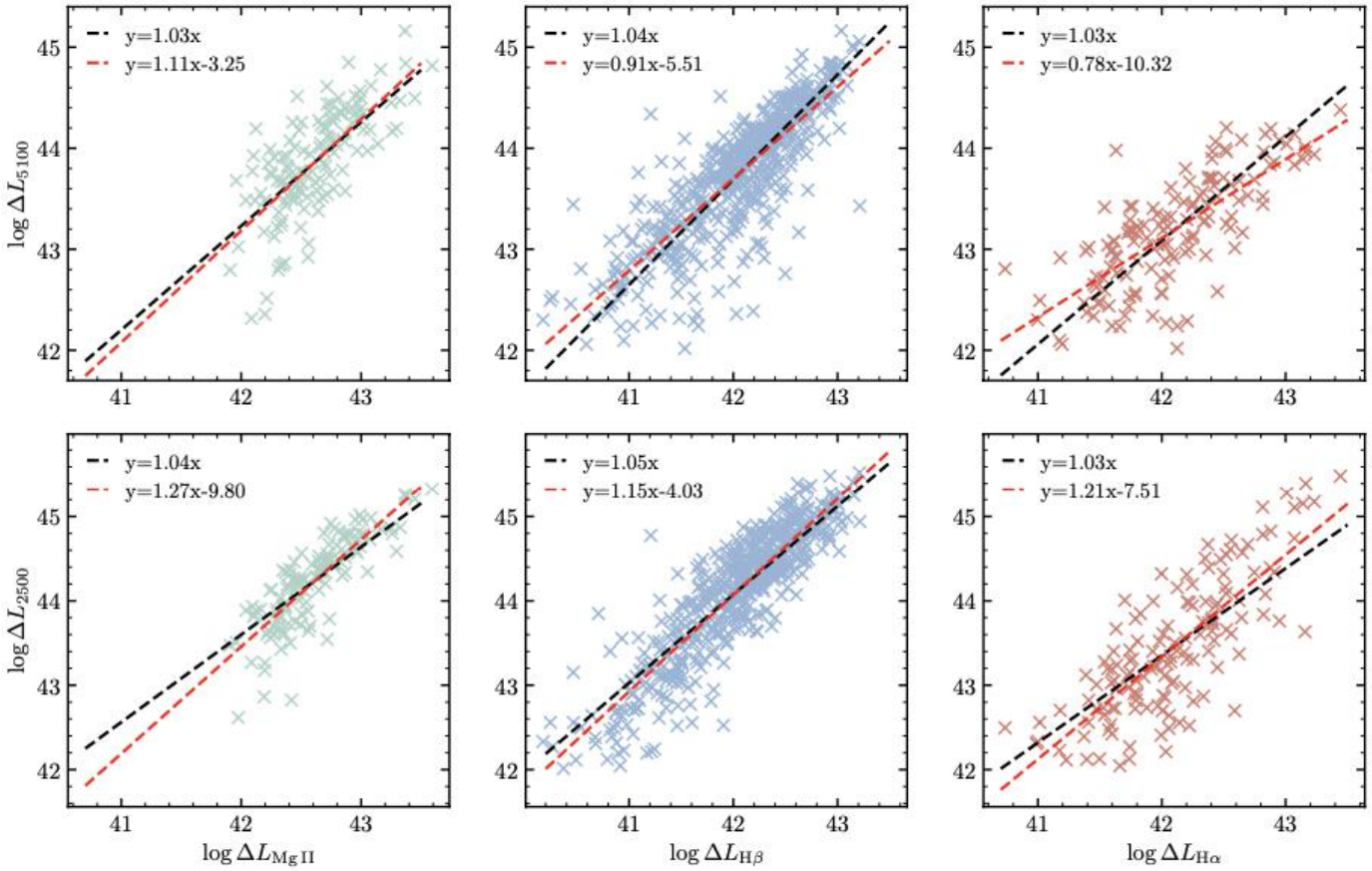
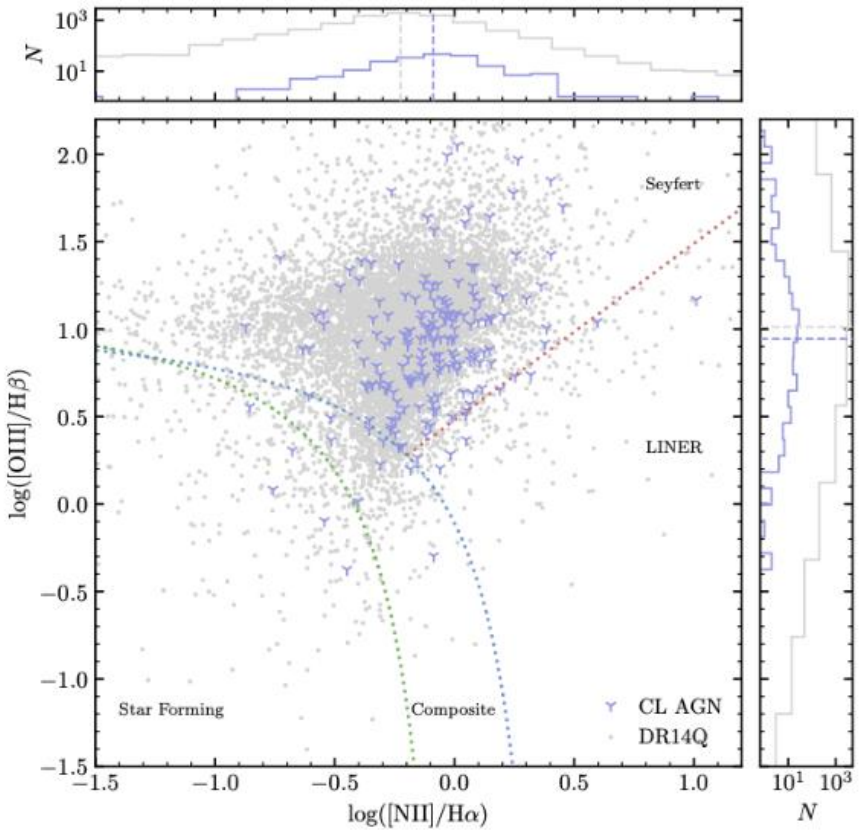


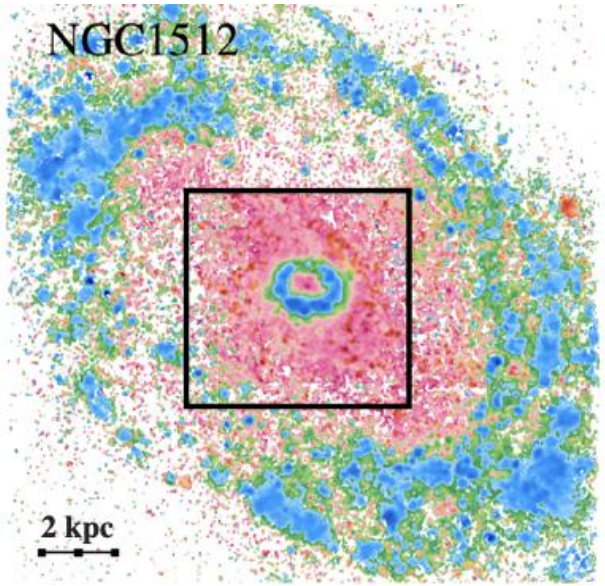


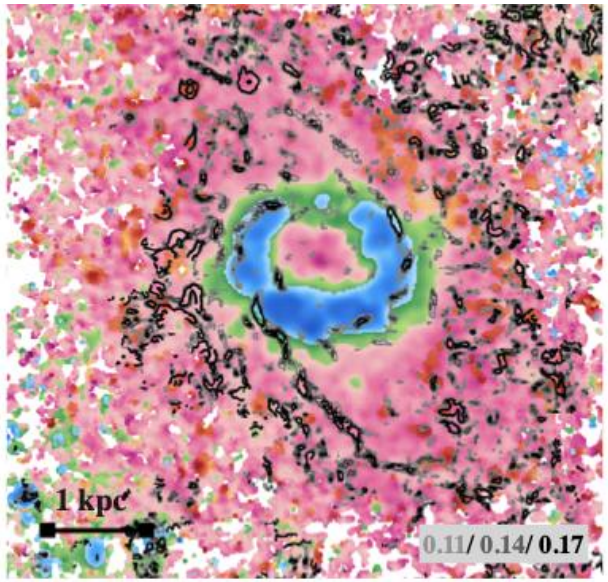


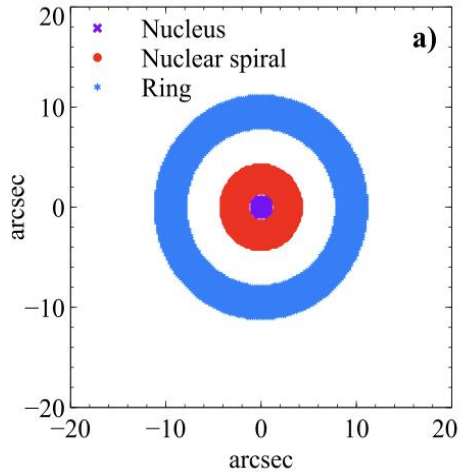


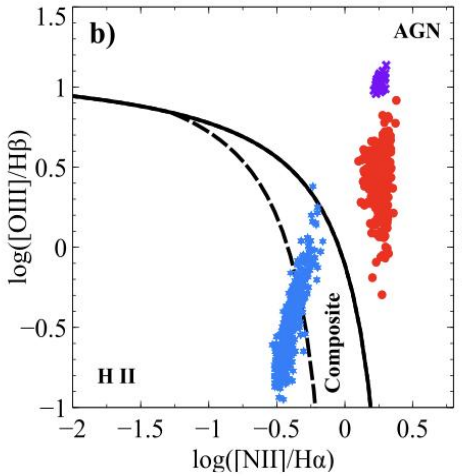
Statistical Results: BPT

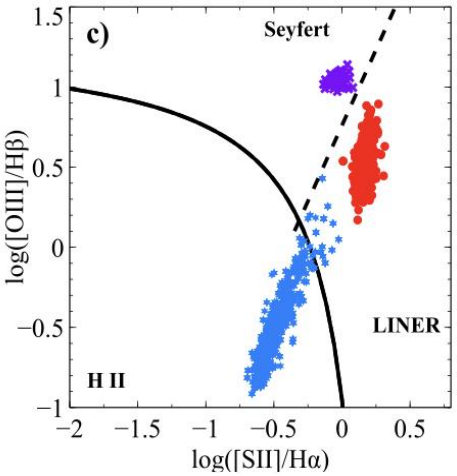












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Statistical Results: Physical Properties

Dark Energy Spectroscopic Instrument

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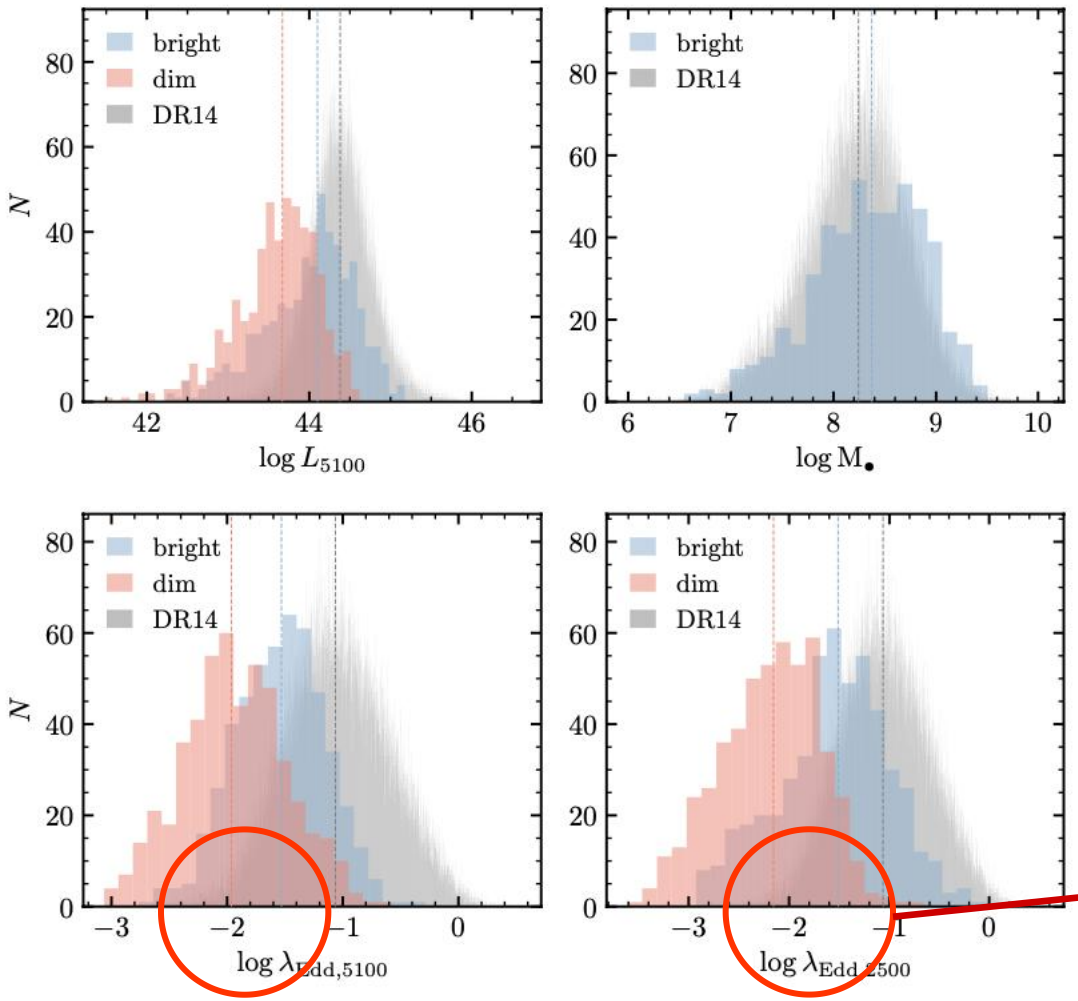
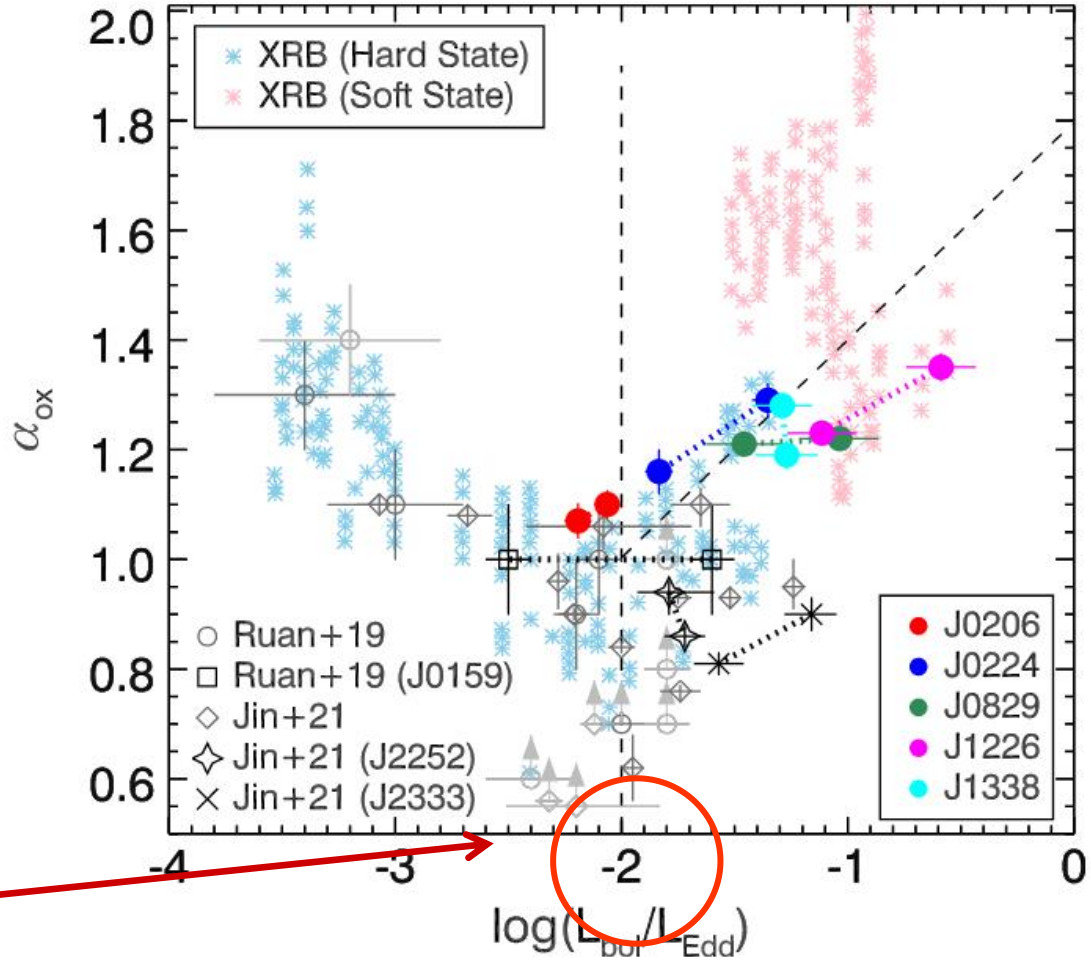
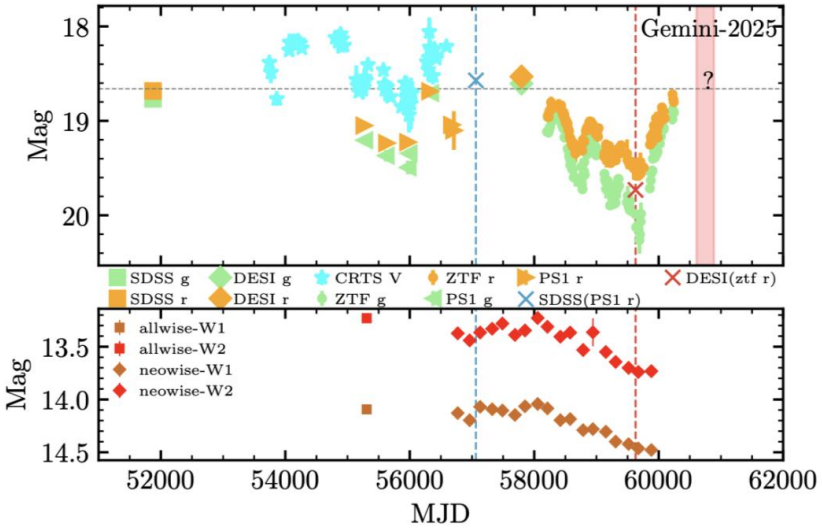
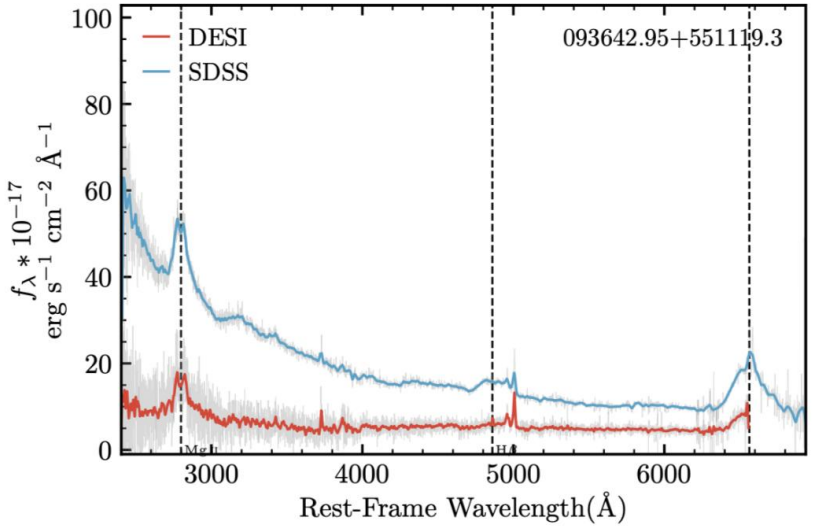
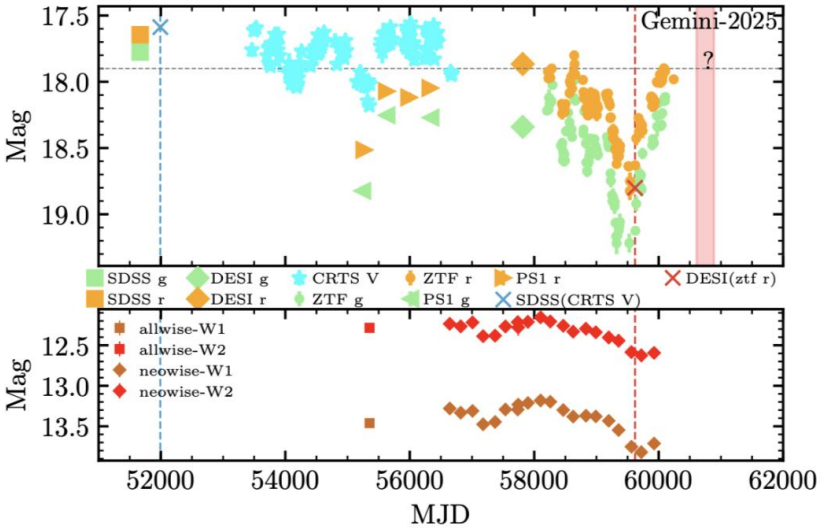


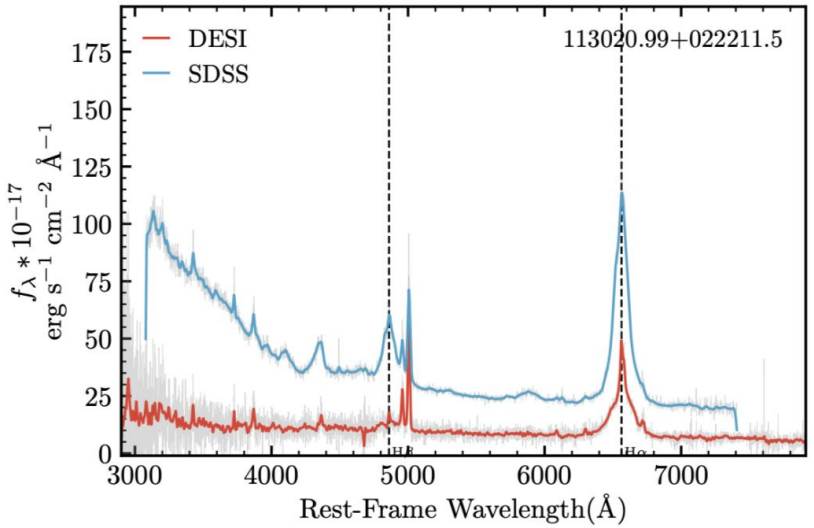


New Class: Recurring CL









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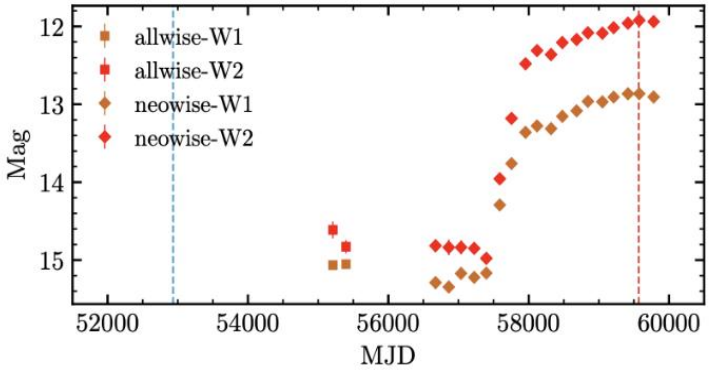
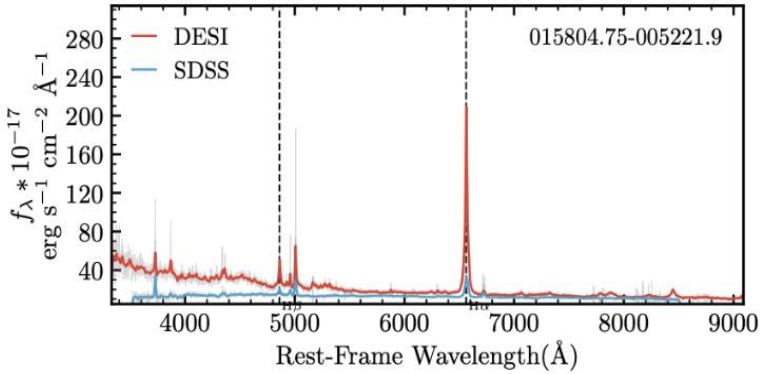
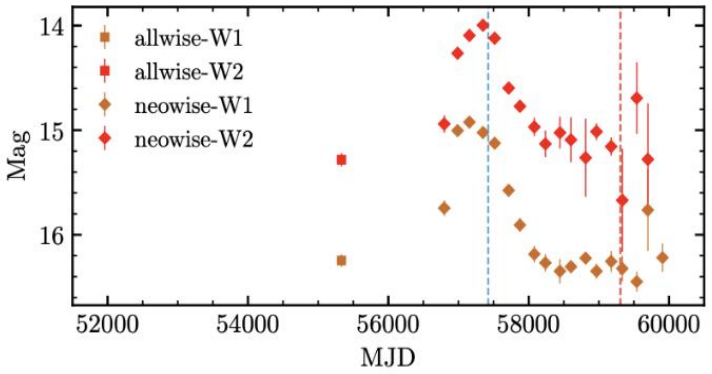
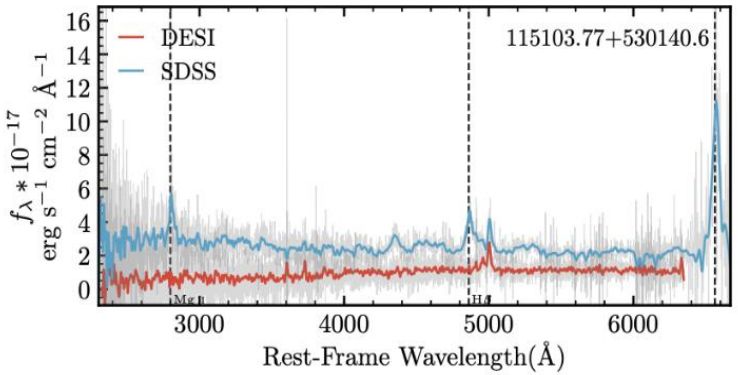
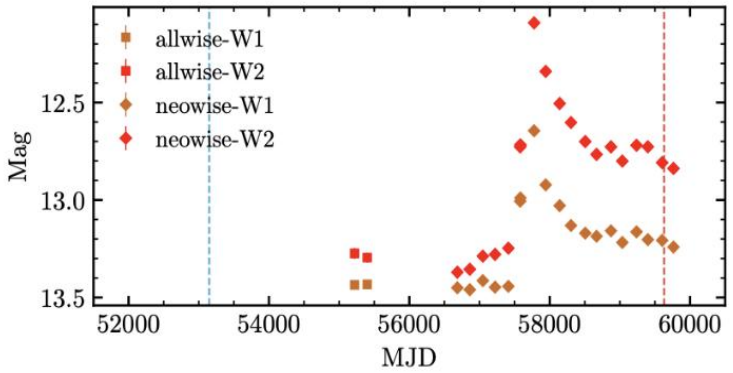
New Class: TDE-like flare

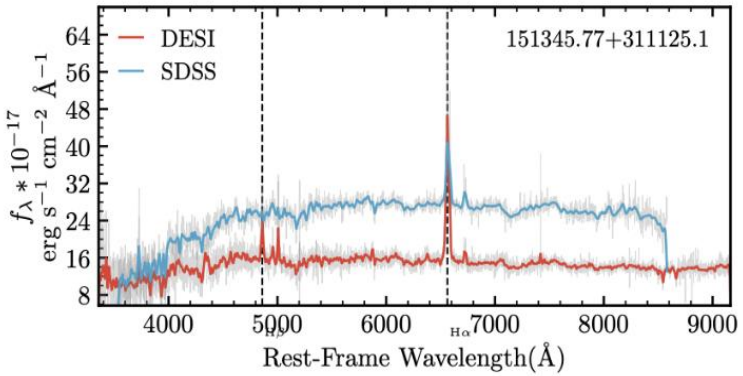


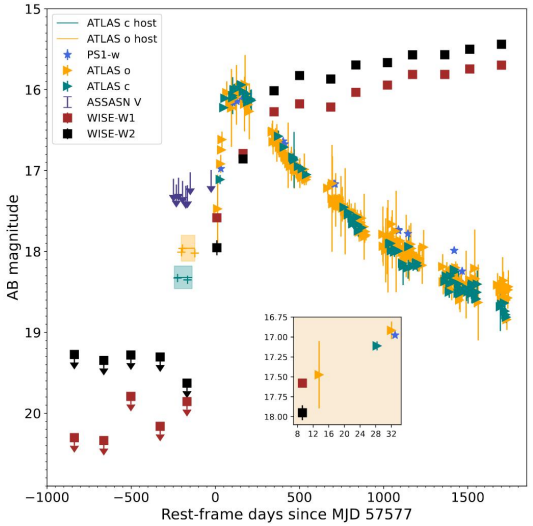


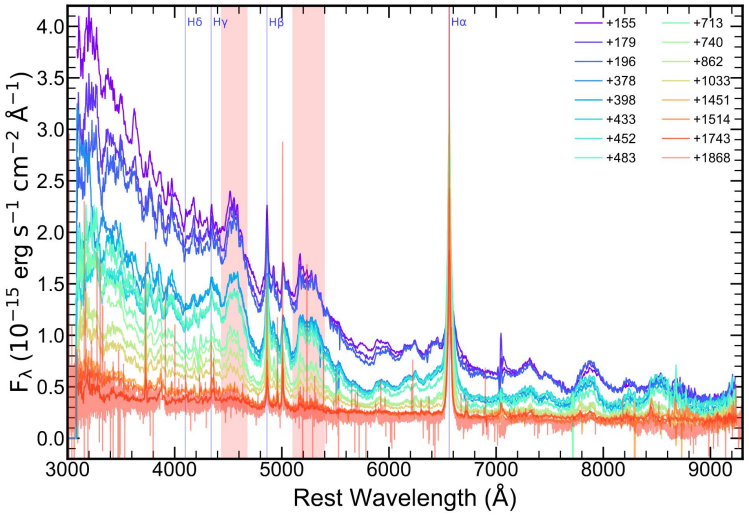












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New Class: Peculiar Changing-look

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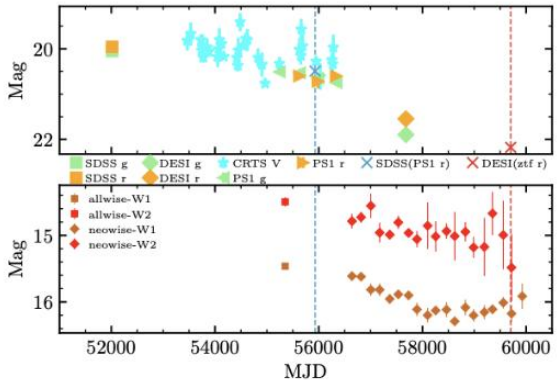

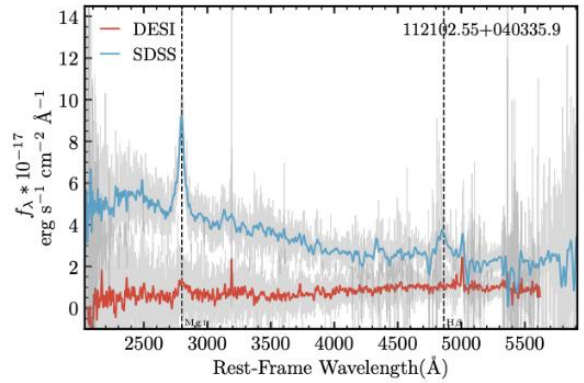

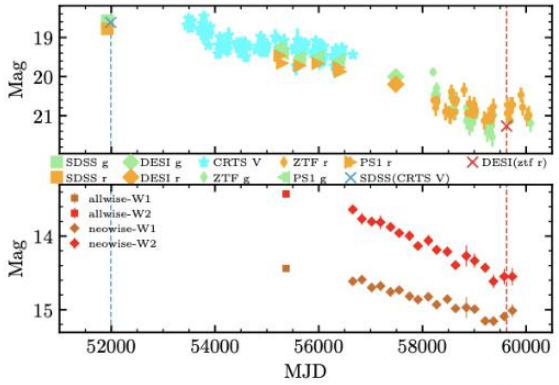

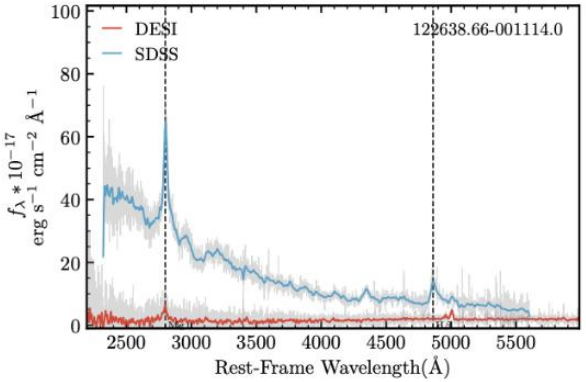

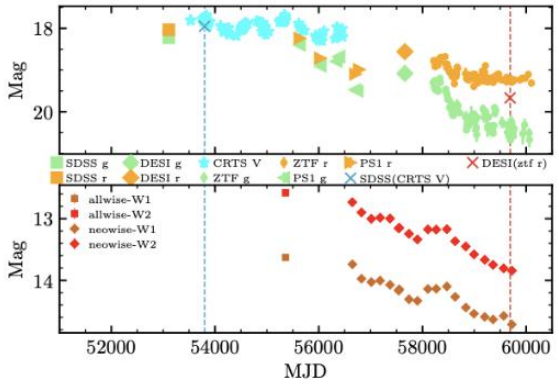

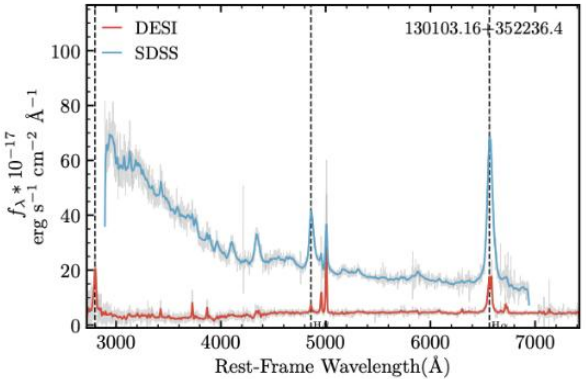

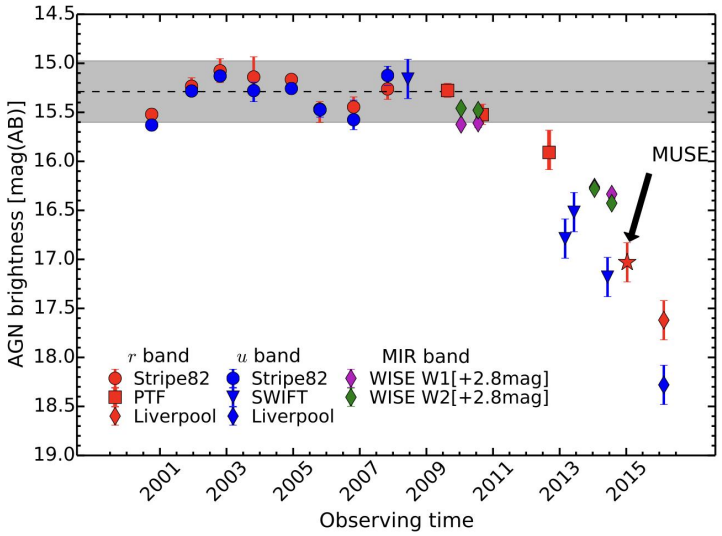

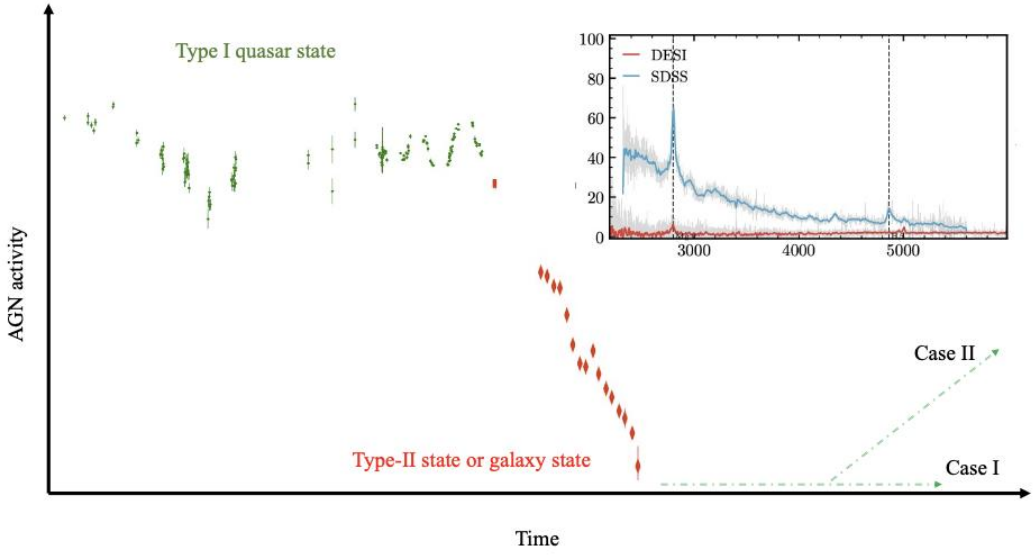

New Classification and physical mechnism

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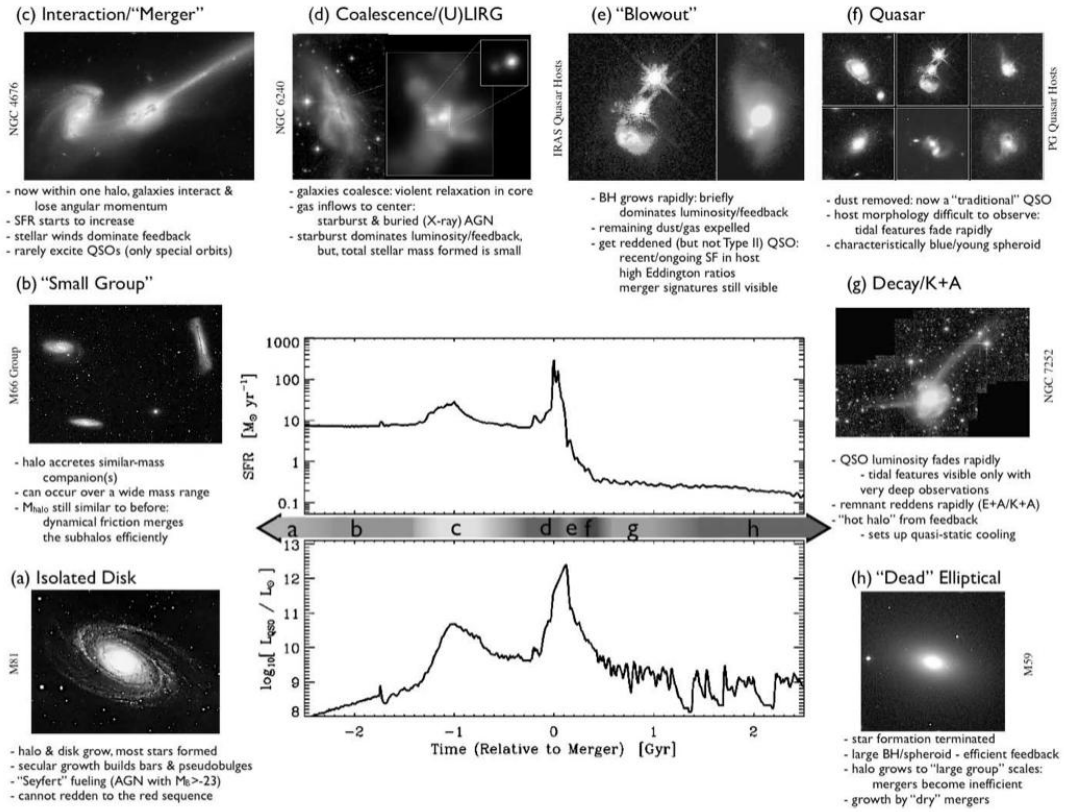
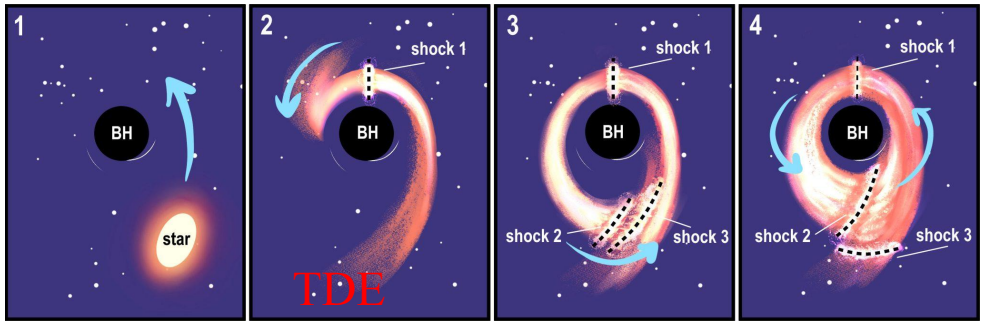
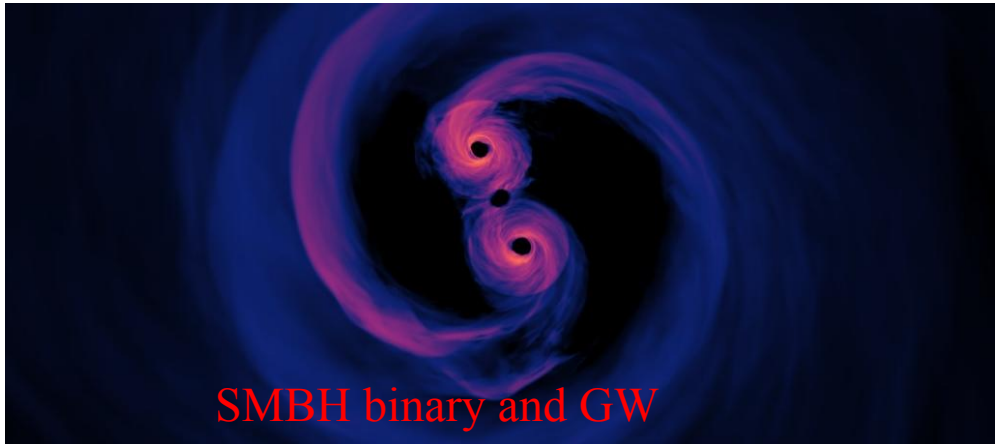
New classification (internal or external)

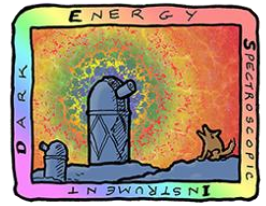
1) Intrisic variability accretion change vs. obscuration
2) flare or temporary AGN
3) external physical mechnism (Tidal disrupt events, SMBH binary , stellar BH binary in the accretion disk etc.)







Contents of Talk



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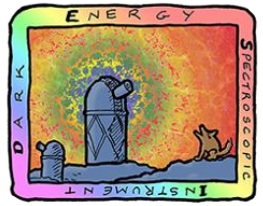
- DESI Survey and First Data Release
- CL-AGNs Research
- The CL-AGNs work in DESI
- Summary

Summary



Dark Energy Spectroscopic Instrument

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Summary:

1: We build the largest CL-AGN sample with less bias (561 objects), and provide statistical results.

2: We give a new classification on the CL-AGN (internal or external)

3: There are too many peculiar objects worthy to studying in detail.

Prospect:

1: A special analysis would be contucted on CL-AGN with TDE-like flare

2: The carried out work on multi-wavelength studies could uncover mistory of the physical mechnism

3: We are looking forwad to find more CL-AGNs.

Thank you!