

Optical polarimetry within the changing-look AGN scenario

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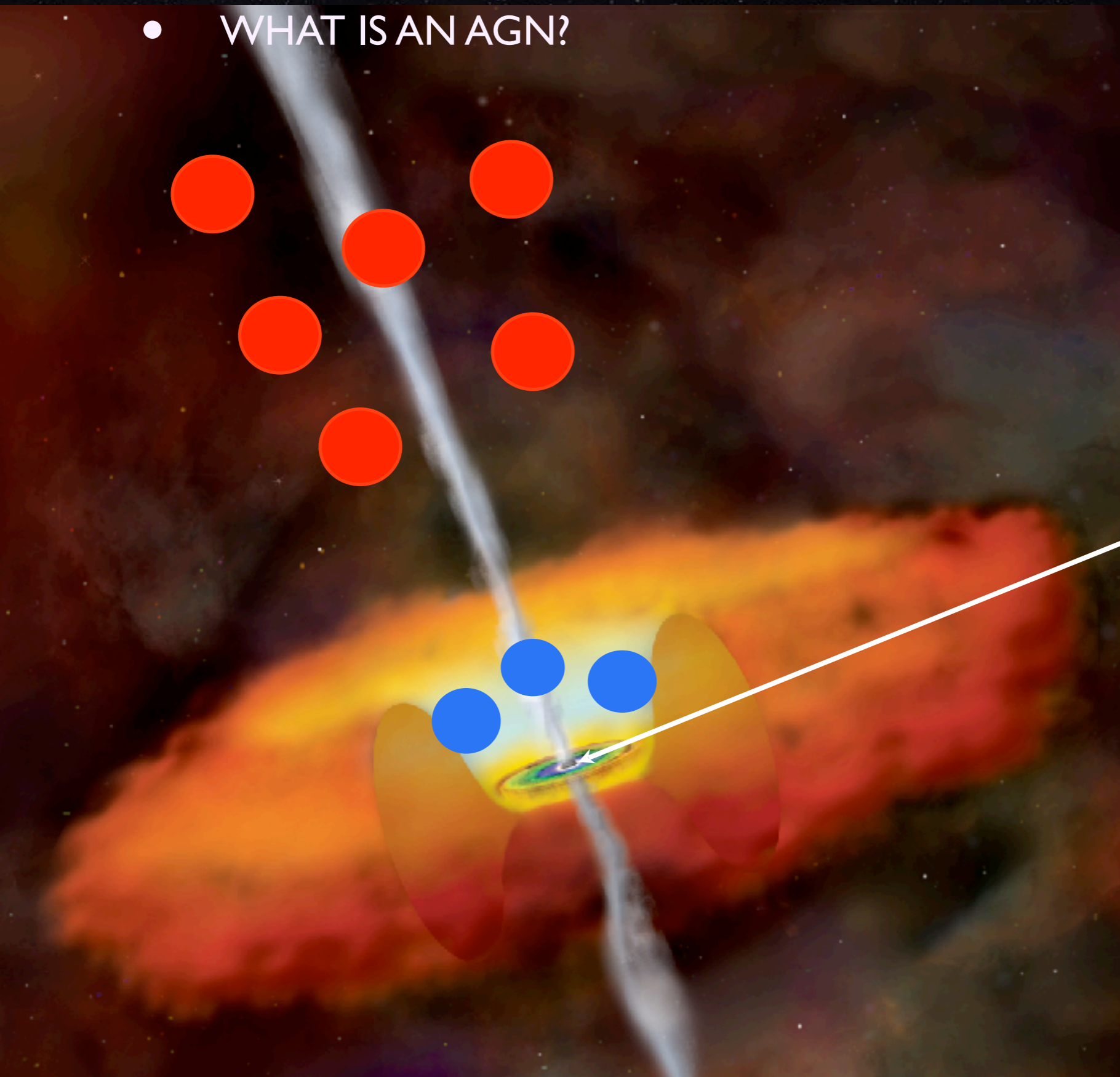
EWASS 2018 - 3rd April, Liverpool

● OUTLINE

- 1. INTRODUCTION TO CHANGING-LOOK AGNs and AGN POLARIZATION
- 2. OPTICAL POLARIMETRY AS A DIAGNOSTIC TOOL WITHIN THE CHANGING-LOOK SCENARIO
- 3. THE CHANGING-LOOK QUASAR J1011+5442
- 4. CONCLUSIONS AND FUTURE WORK

- **INTRODUCTION**

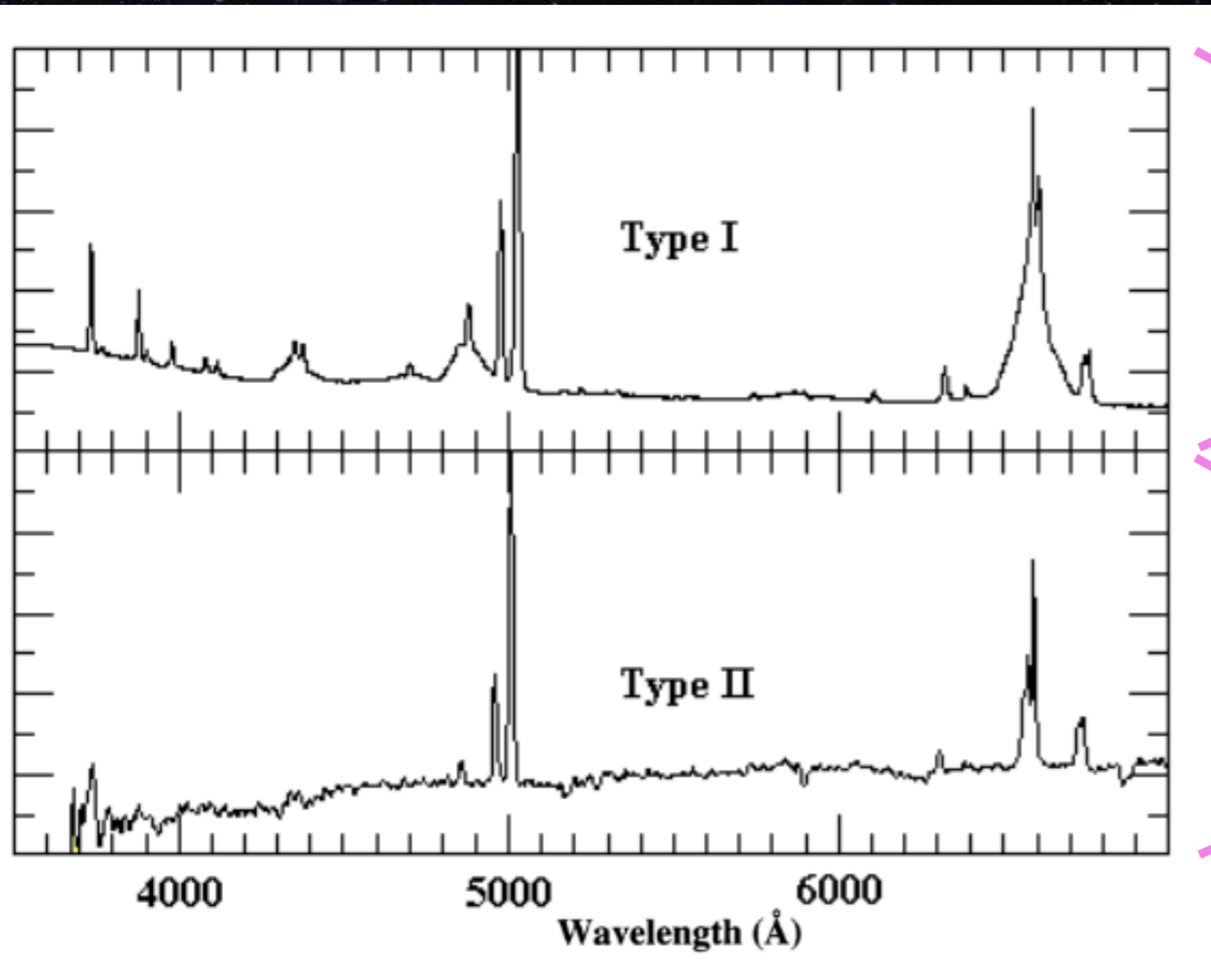
- **WHAT IS AN AGN?**



SMBH

- **INTRODUCTION**

- **AGN CLASSIFICATION**



Broad Lines ($v > 1000$ km/s)
+
Narrow Lines ($v < 1000$ km/s)

ONLY Narrow Lines

• INTRODUCTION

- UNIFIED MODEL (Antonucci, R. 1993)



Narrow Line Region ($v > 1000$ km/s)



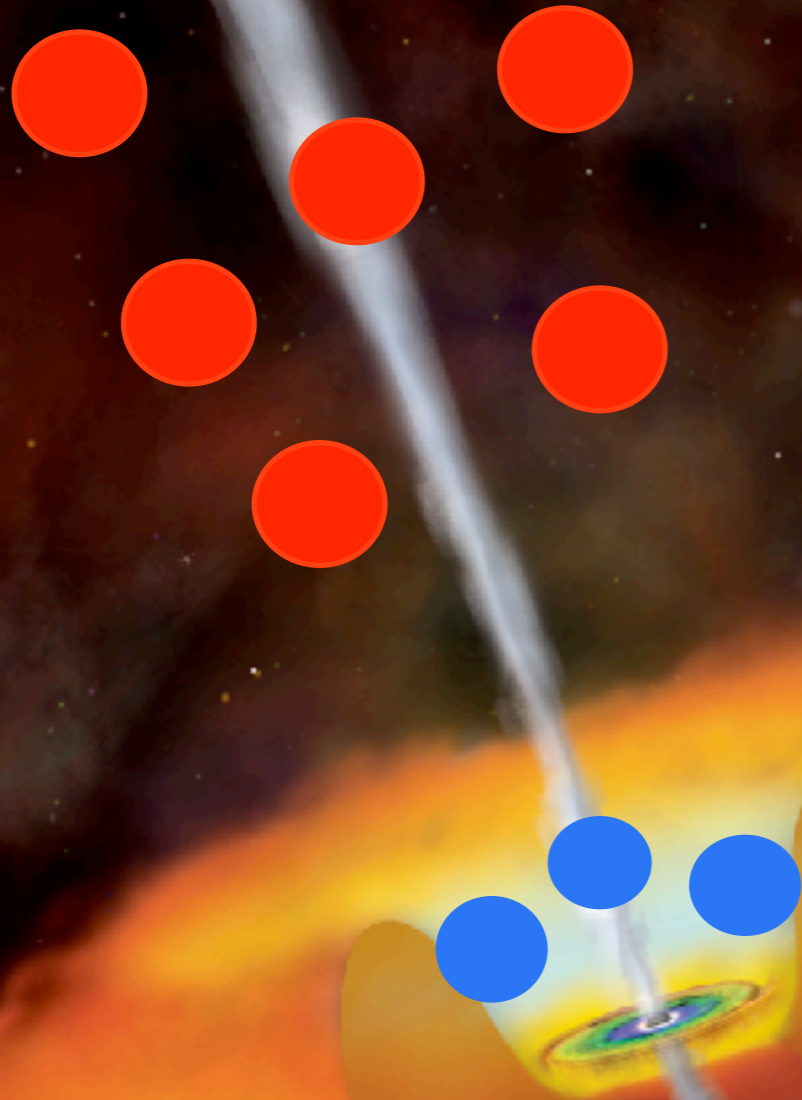
Broad Line Region ($v < 1000$ km/s)

ABSORBING TORUS



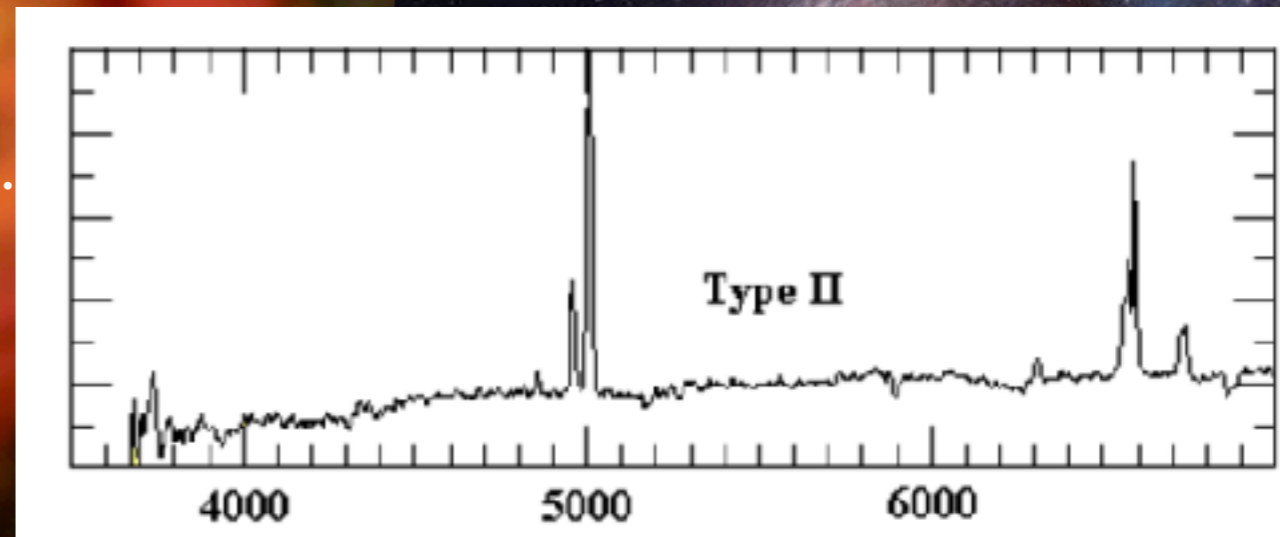
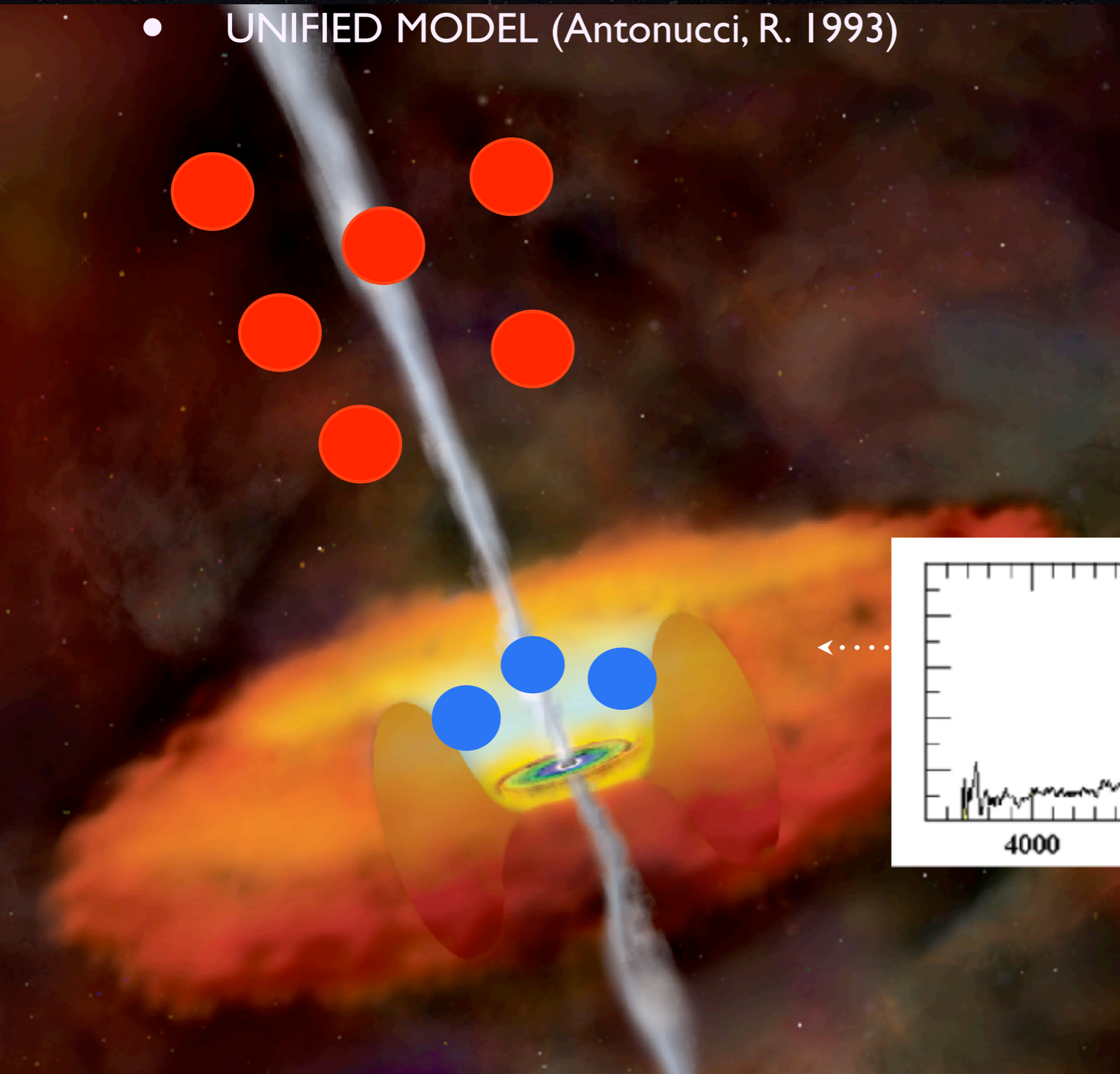
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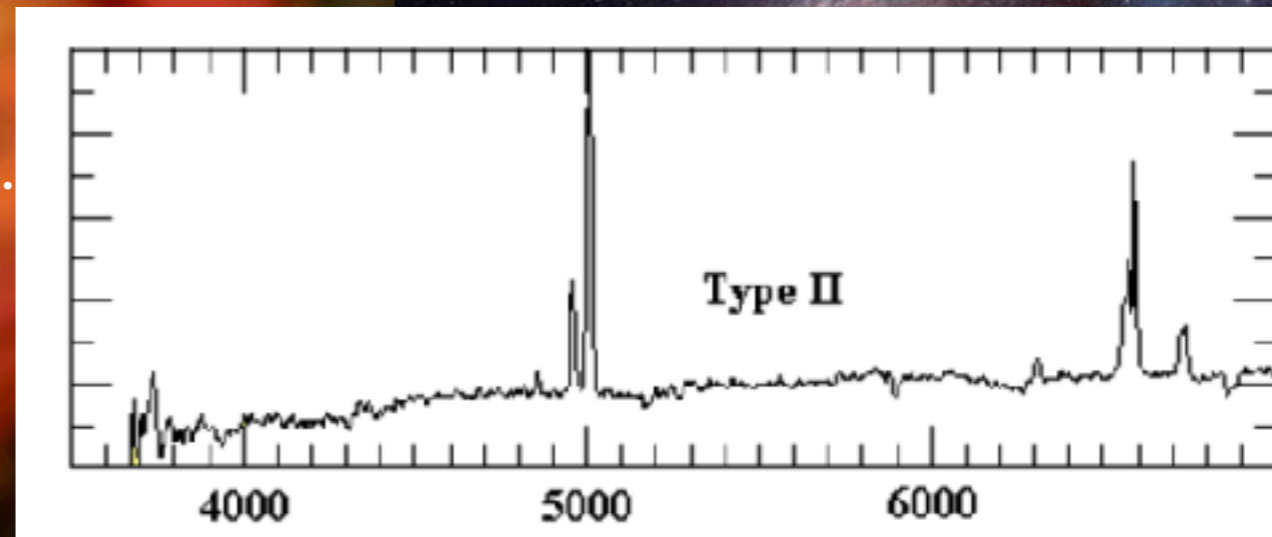
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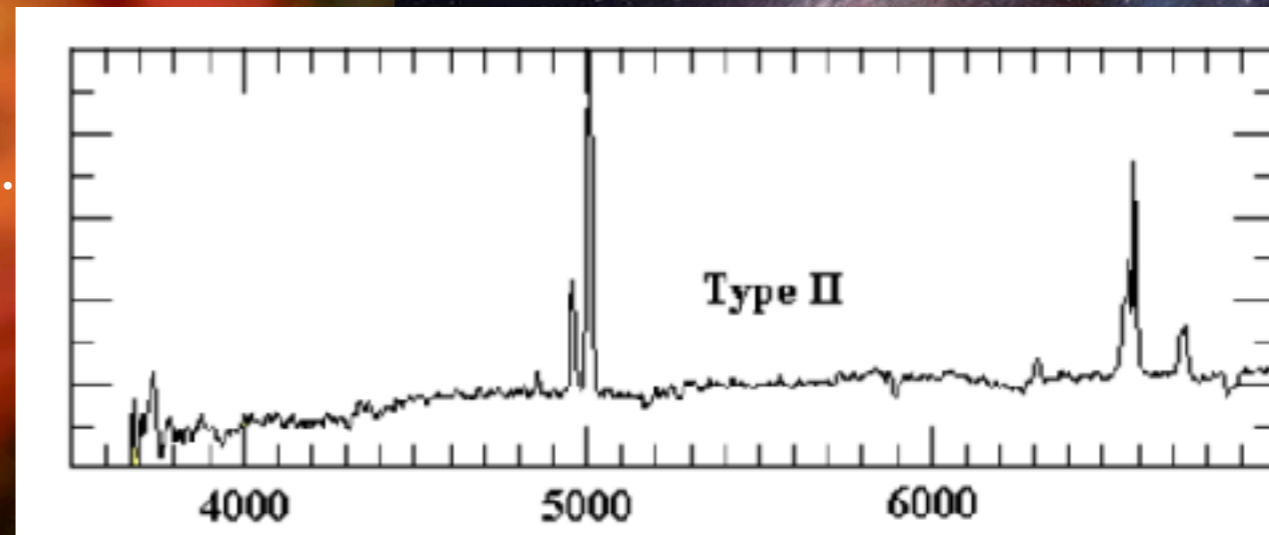
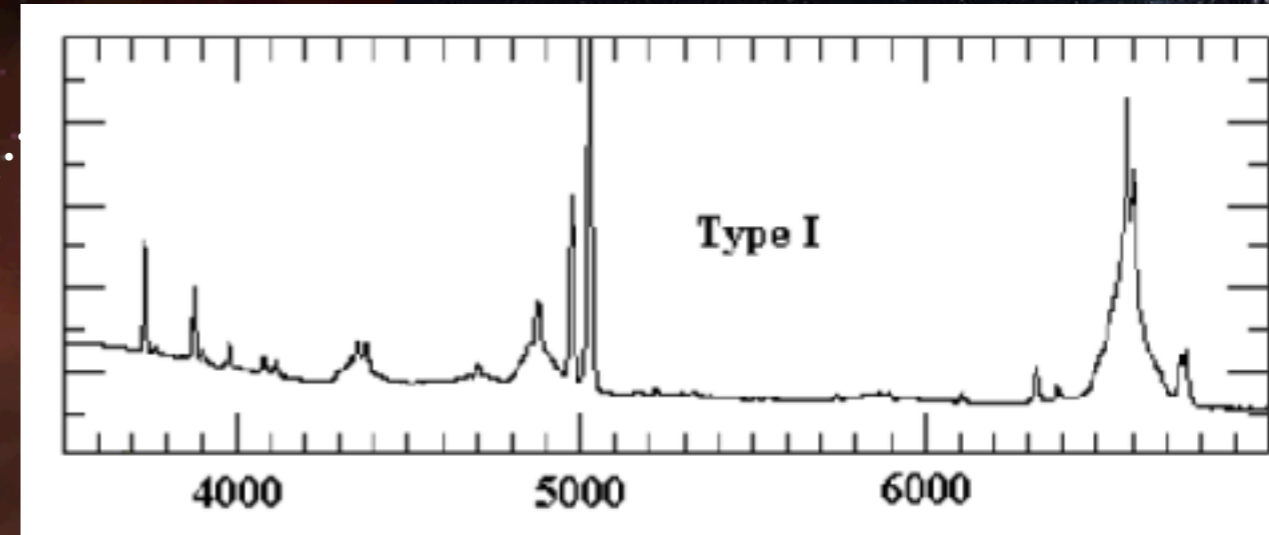
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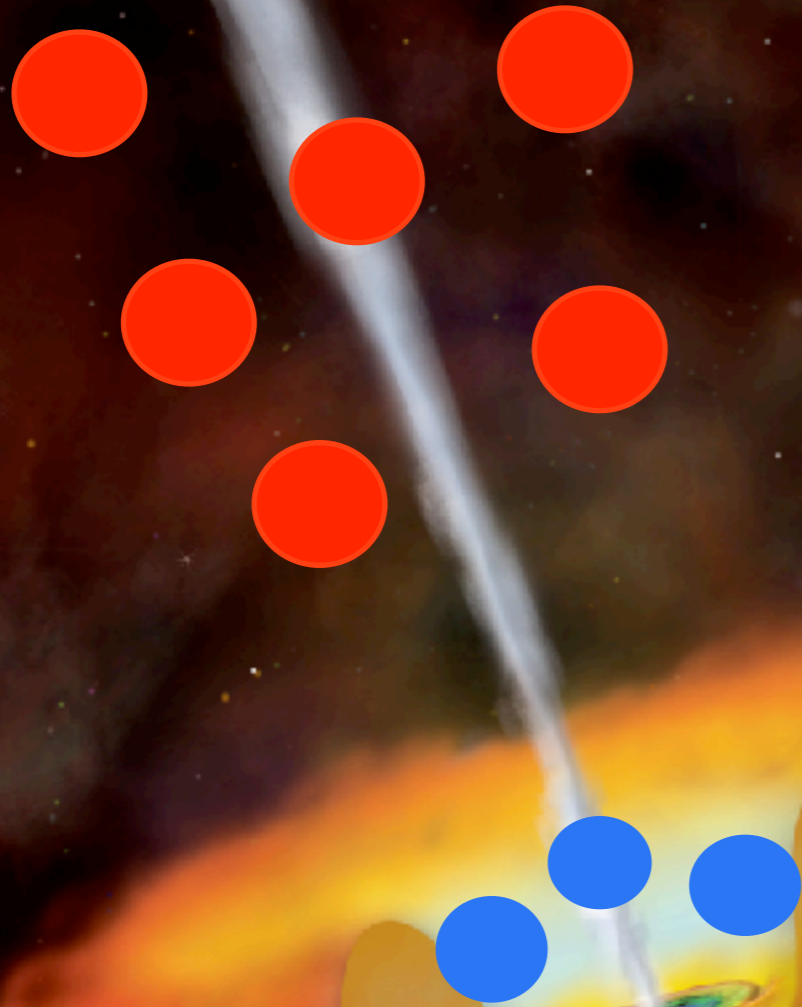
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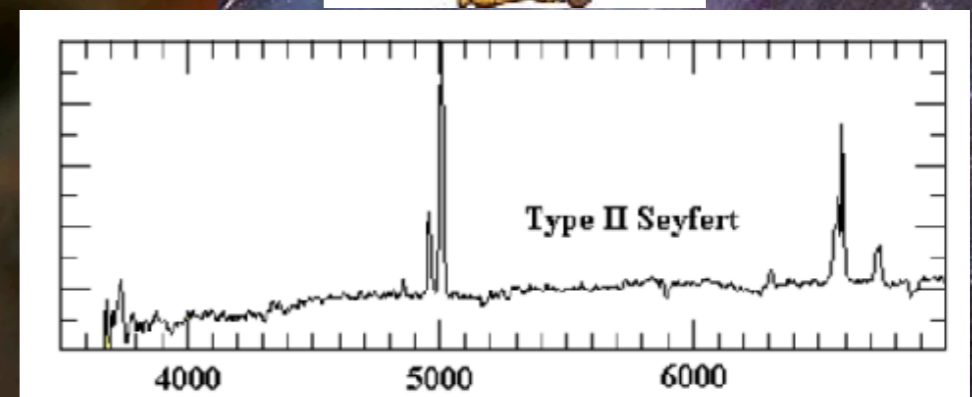
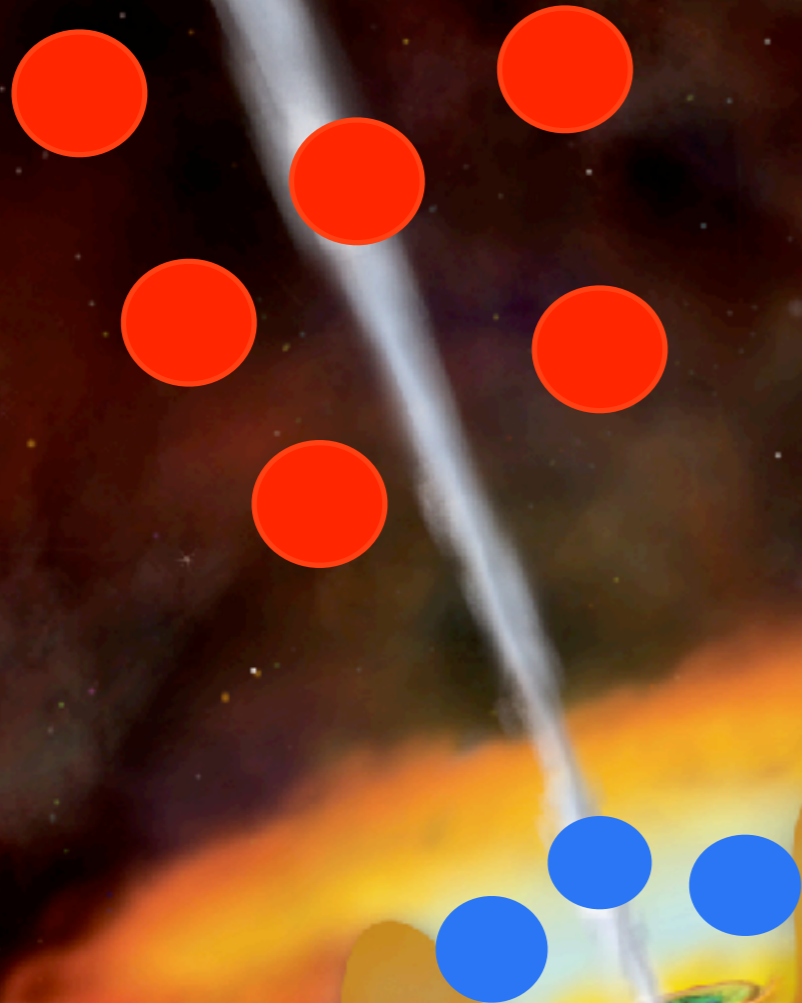
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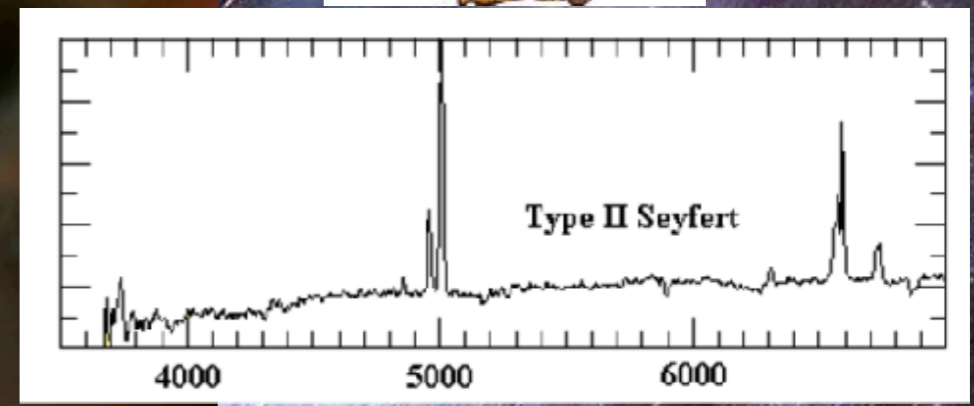
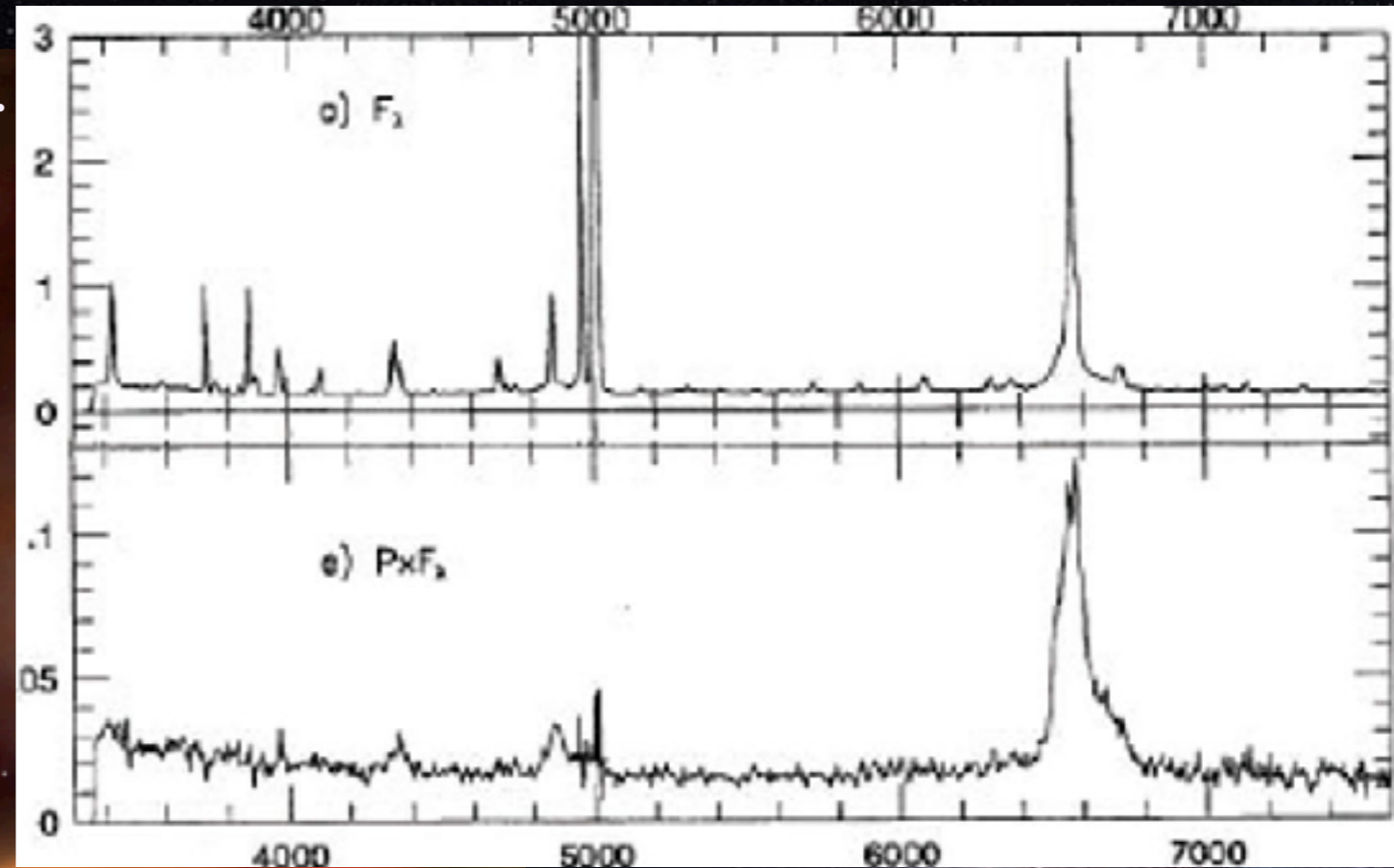
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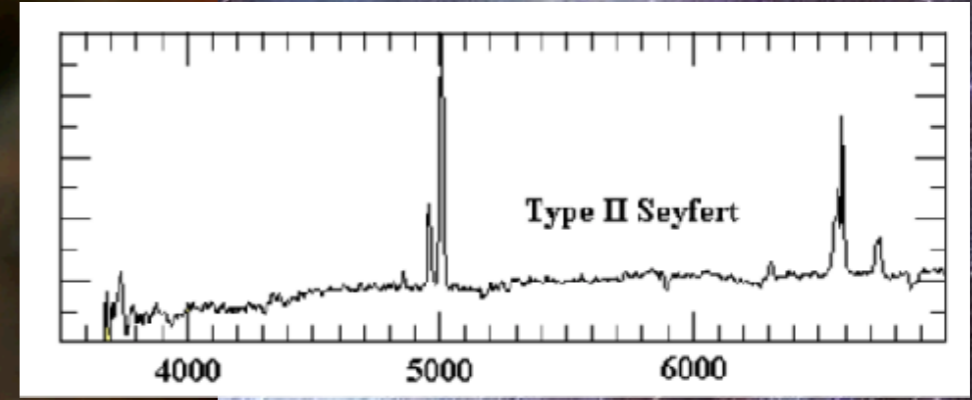
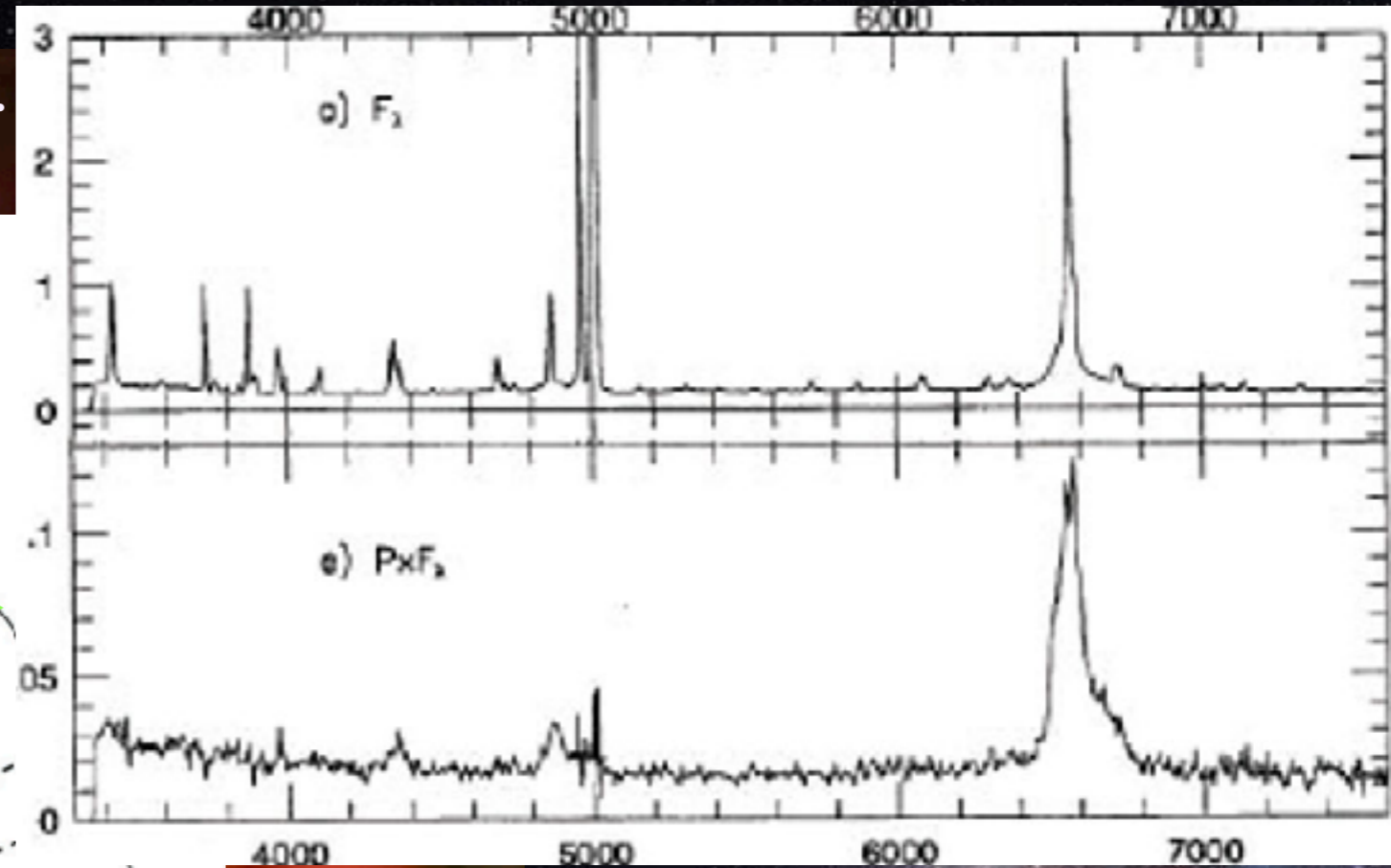
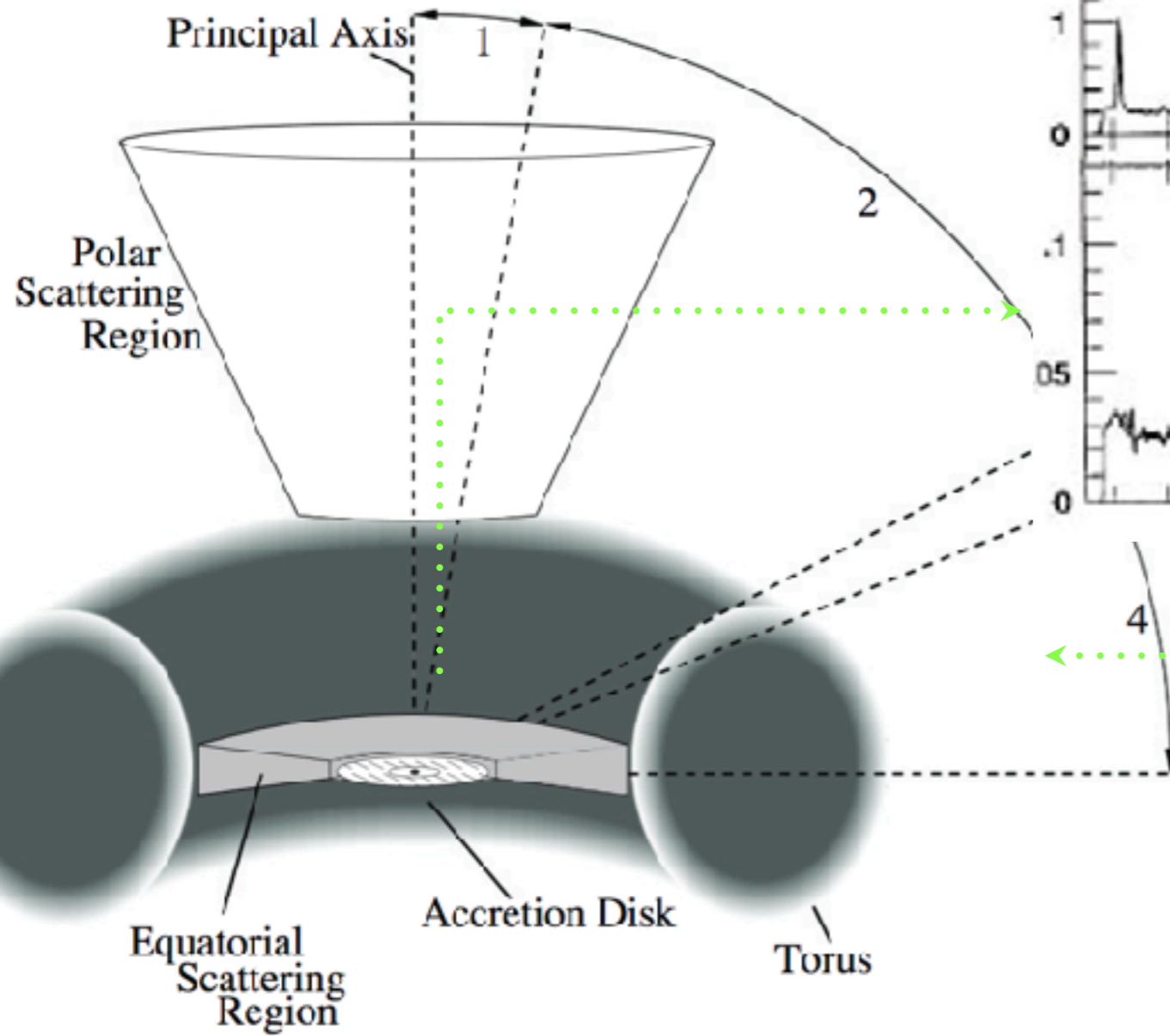
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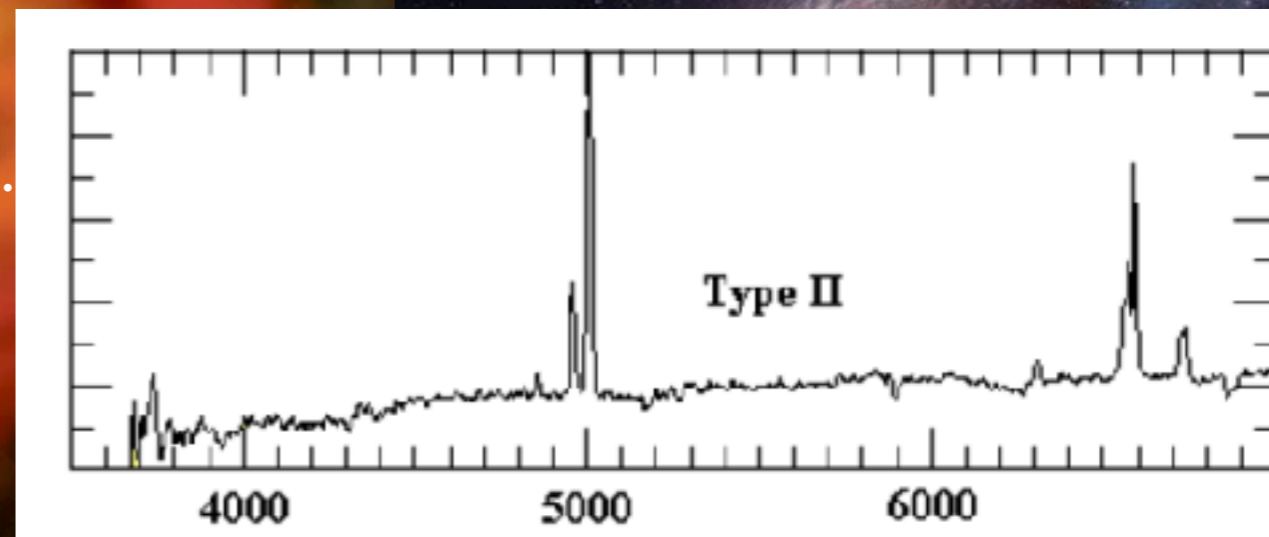
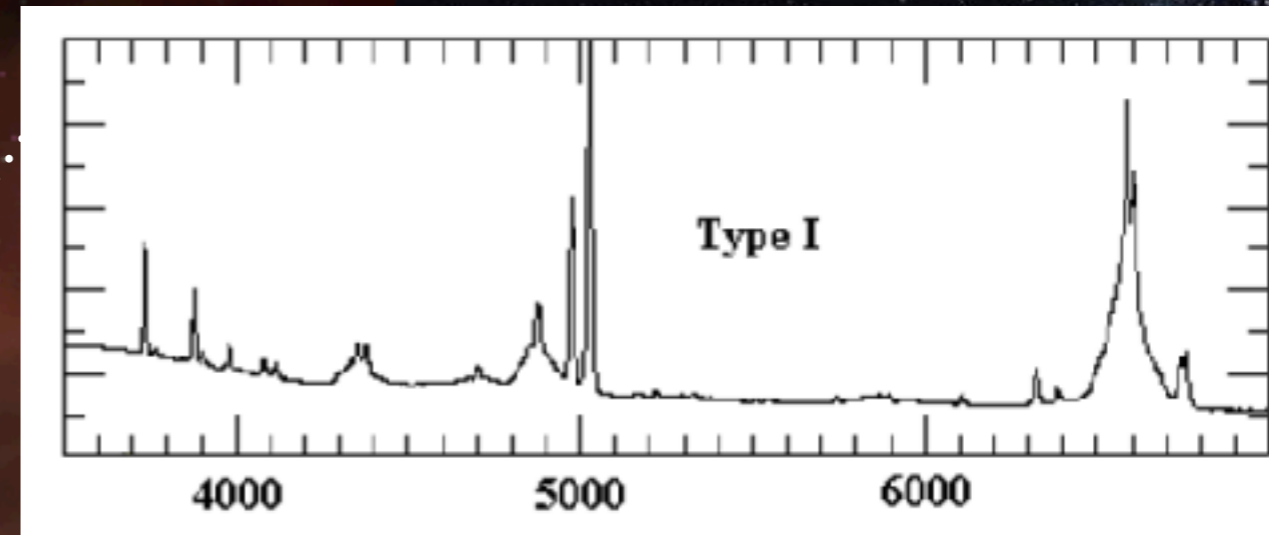
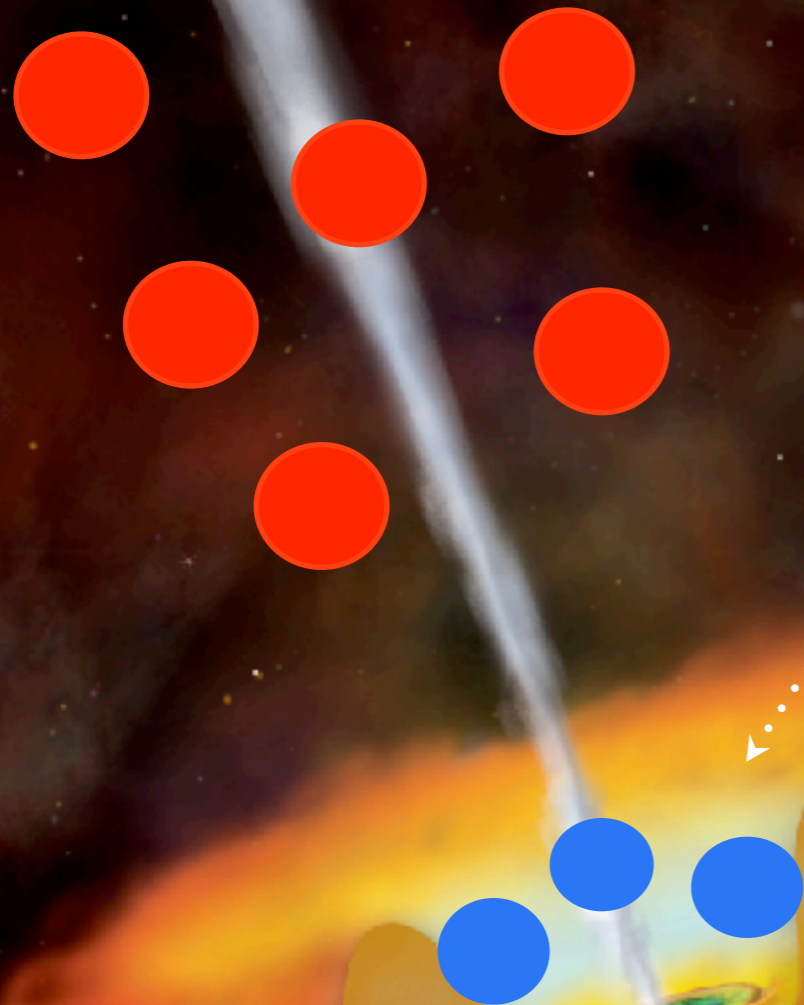
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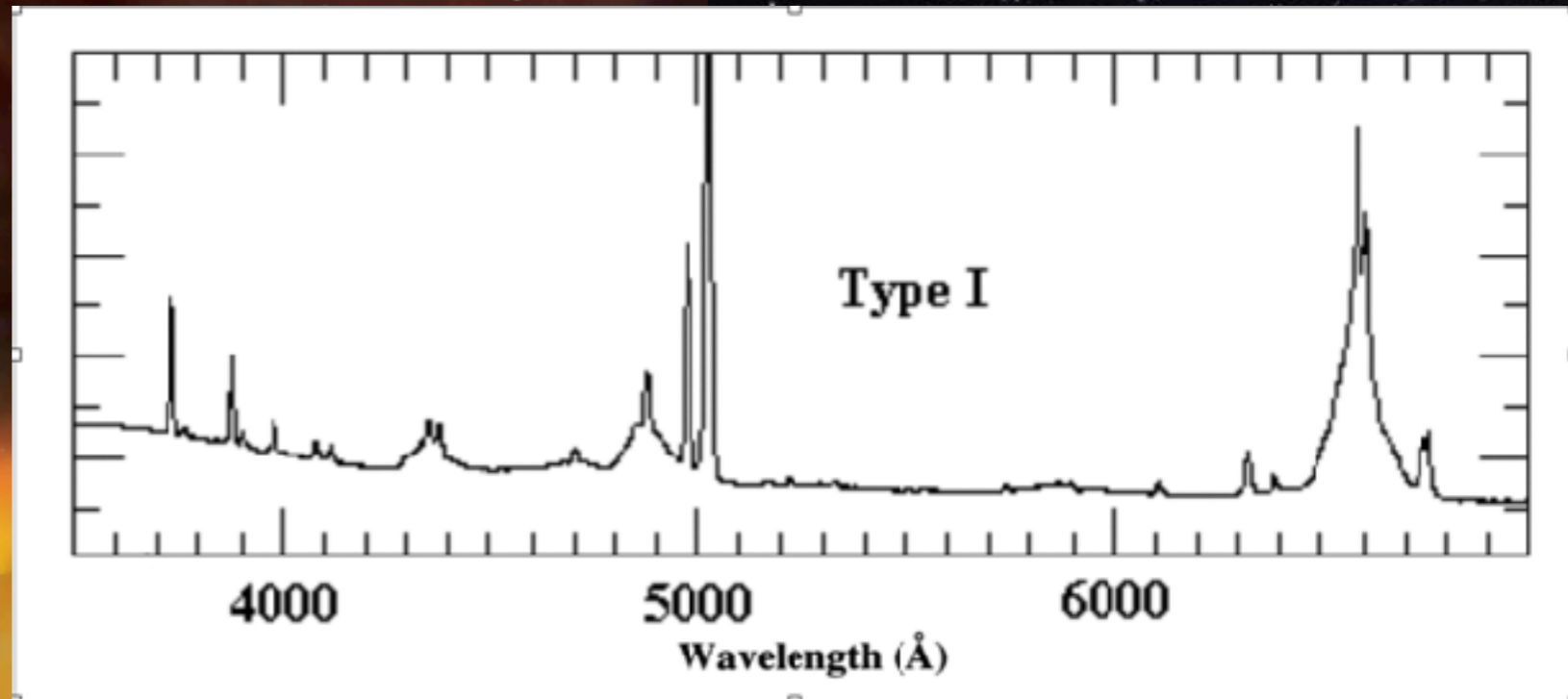
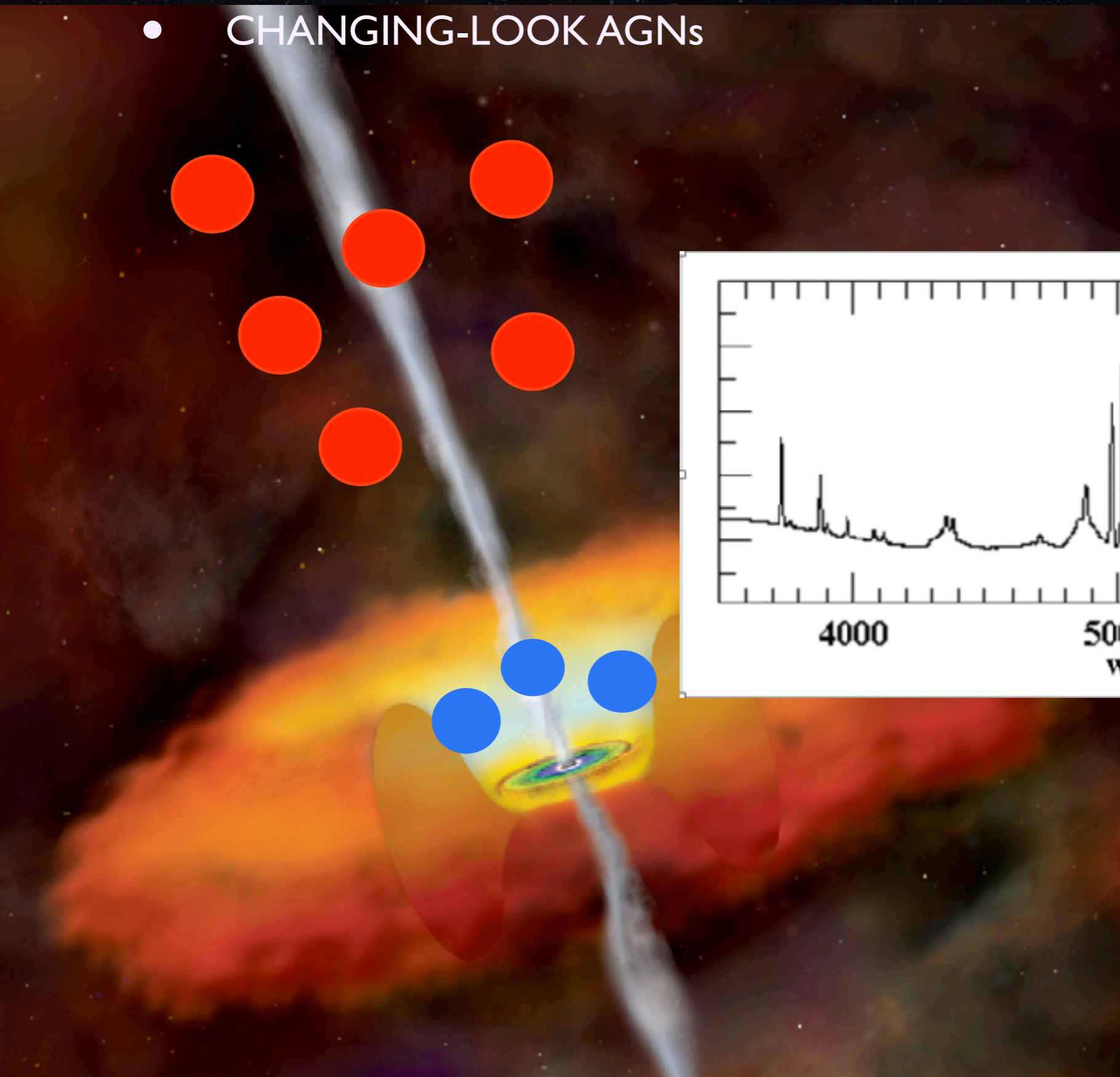
- INTRODUCTION

- CHANGING-LOOK AGNs



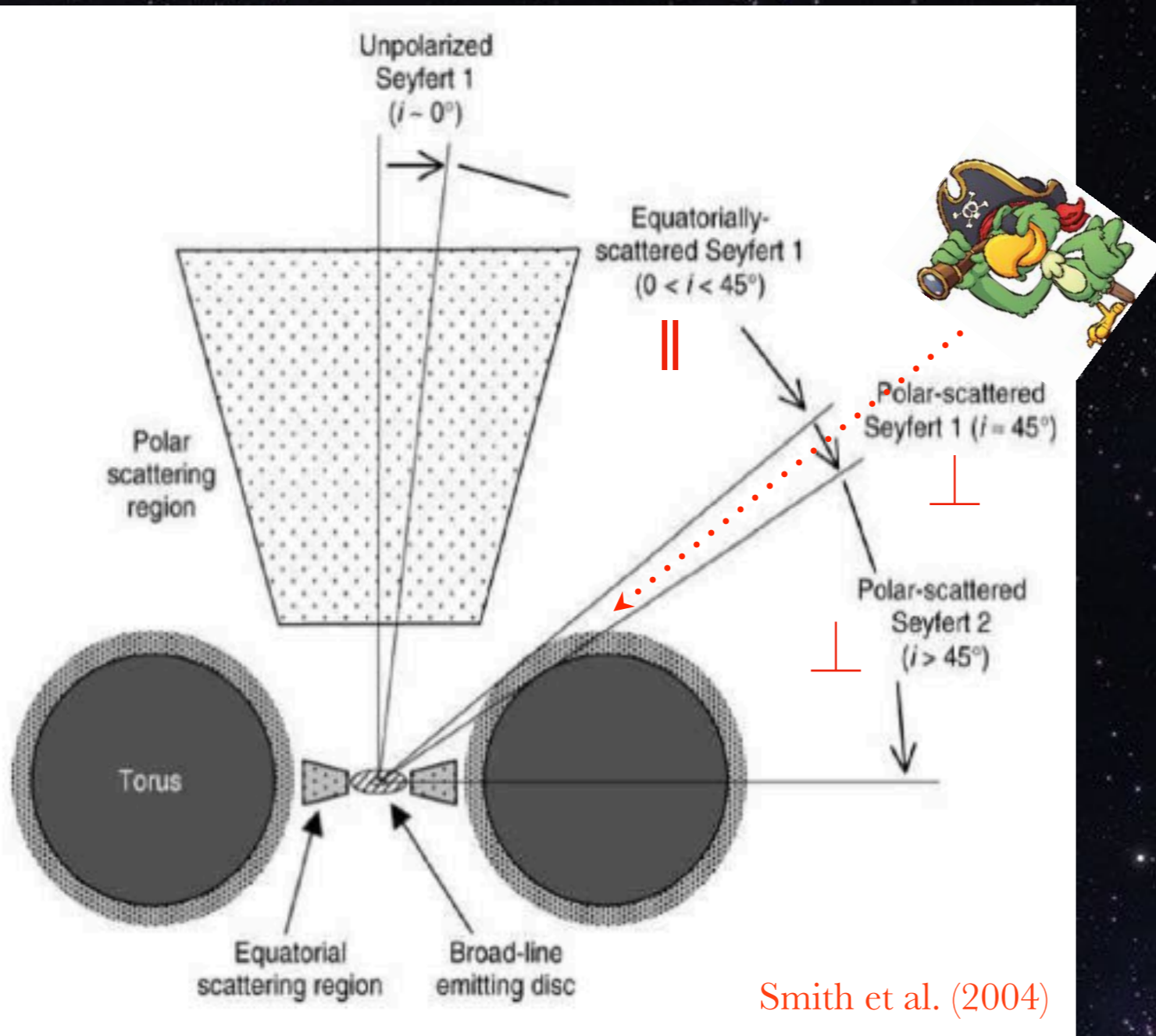
- **INTRODUCTION**

- **CHANGING-LOOK AGNs**



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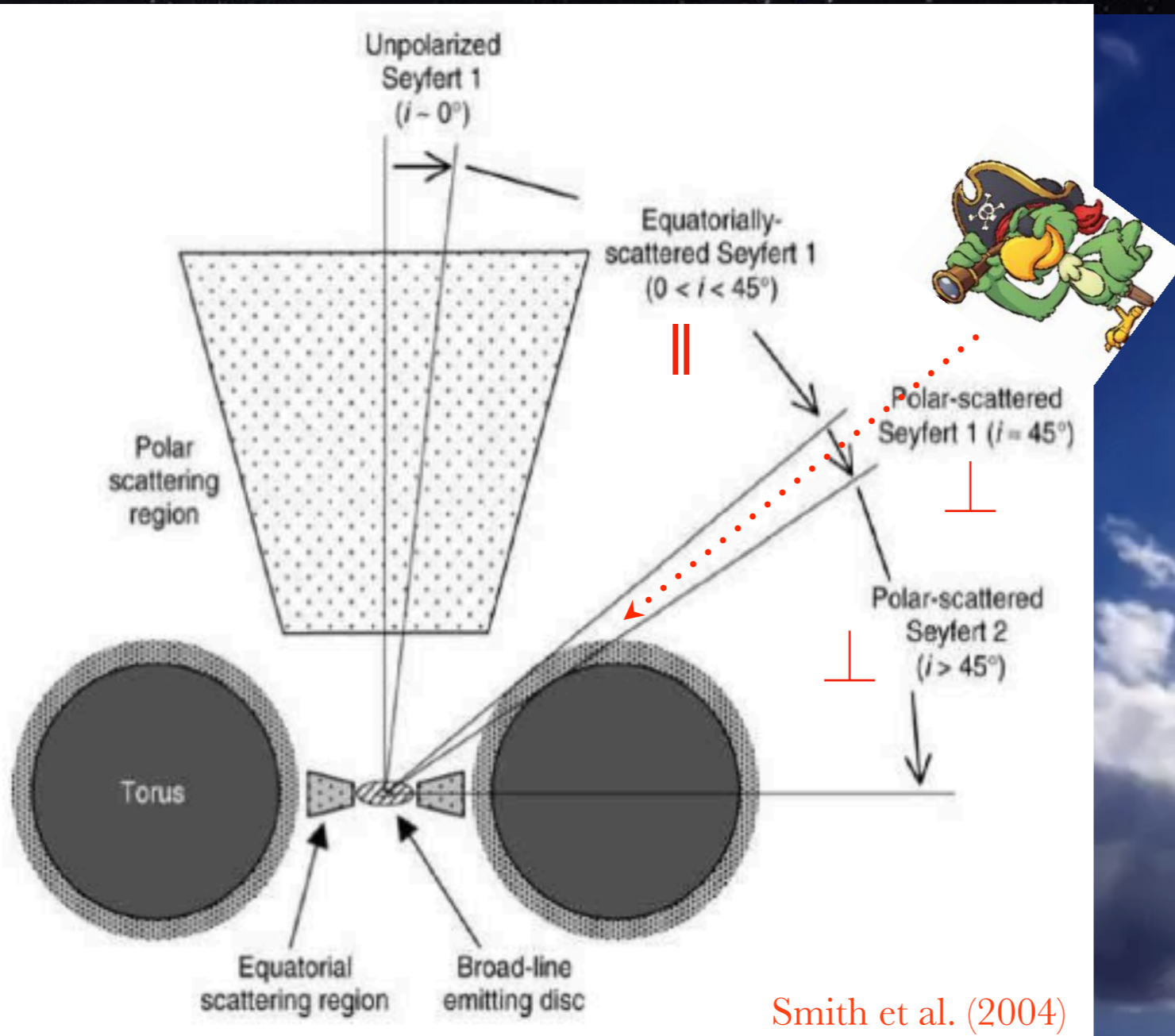
- CHANGING-LOOK AGNs : VARIABLE OBSCURATION CASE



Smith et al. (2004)

• INTRODUCTION

- CHANGING-LOOK AGNs : VARIABLE OBSCURATION CASE



Smith et al. (2004)



- **INTRODUCTION**

- CHANGING-LOOK AGNs : SWITCH-OFF/ON CASE



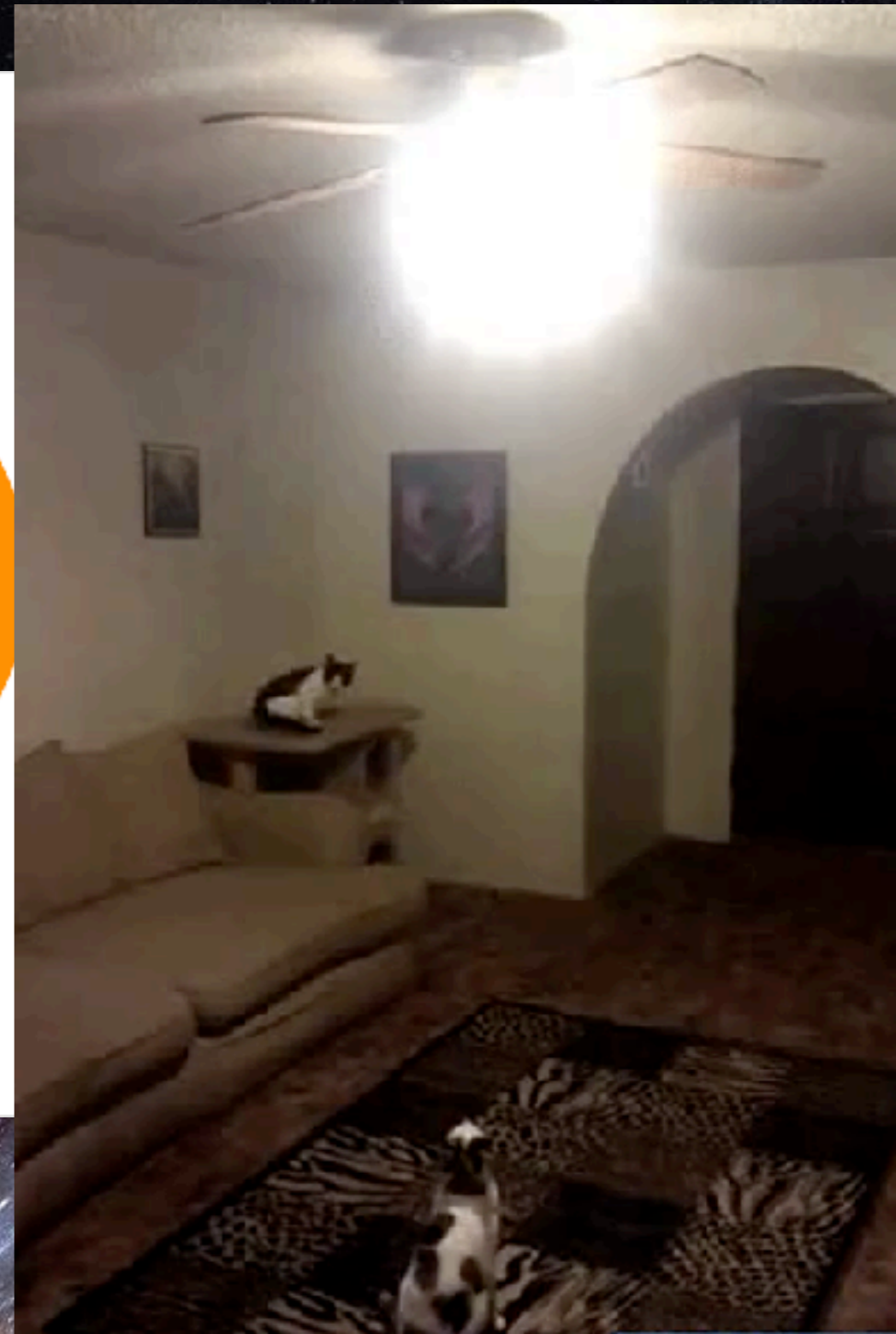
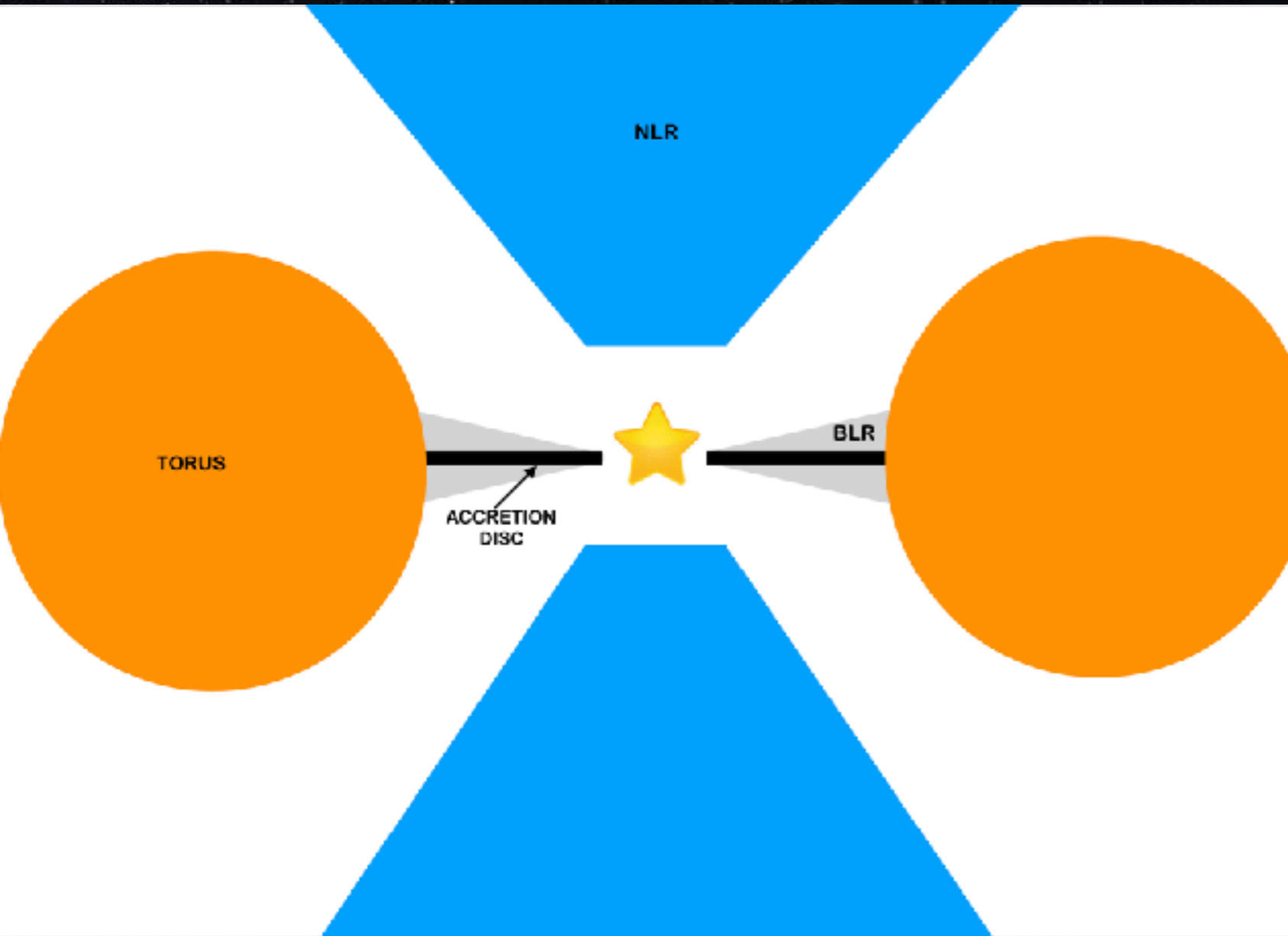
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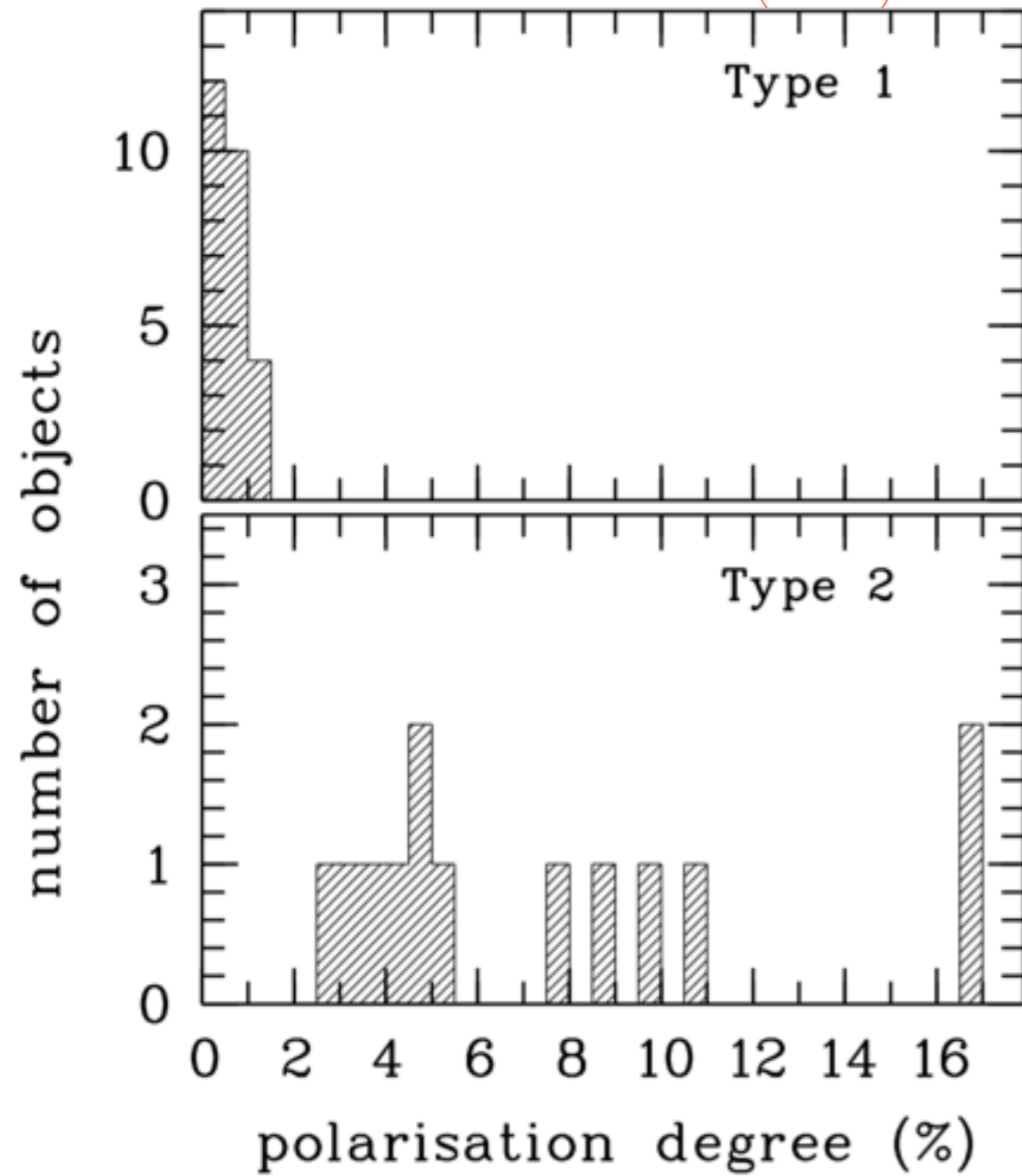
● INTRODUCTION

- CHANGING-LOOK QUASARS DETECTED SO FAR: **~20 SOURCES**

LaMassa et al. (2015)	J0159+0033	disappearing BELs
Runnoe et al. (2016)	J1011+5442	disappearing BELs
Ruan et al. (2016)	J0126-0839	disappearing BELs
	J2336+0017	disappearing BELs
MacLeod et al. (2016)	J0023+0035	appearing BELs
	J0225+0030	both
	J0226-0039	disappearing BELs
	J1002+4509	disappearing BELs
	J1021+4645	disappearing BELs
	J1324+4802	disappearing BELs
	J2146+0009	appearing BELs
	J2252+0109	appearing BELs
	J2333-0023	appearing BELs
Gezari et al. (2017)	J1554+3629	appearing BELs

- **OPTICAL POLARIMETRY** as a changing-look tool
- DICHOTOMY TYPE-1 / TYPE-2

Hutsemékers et al. (2017)



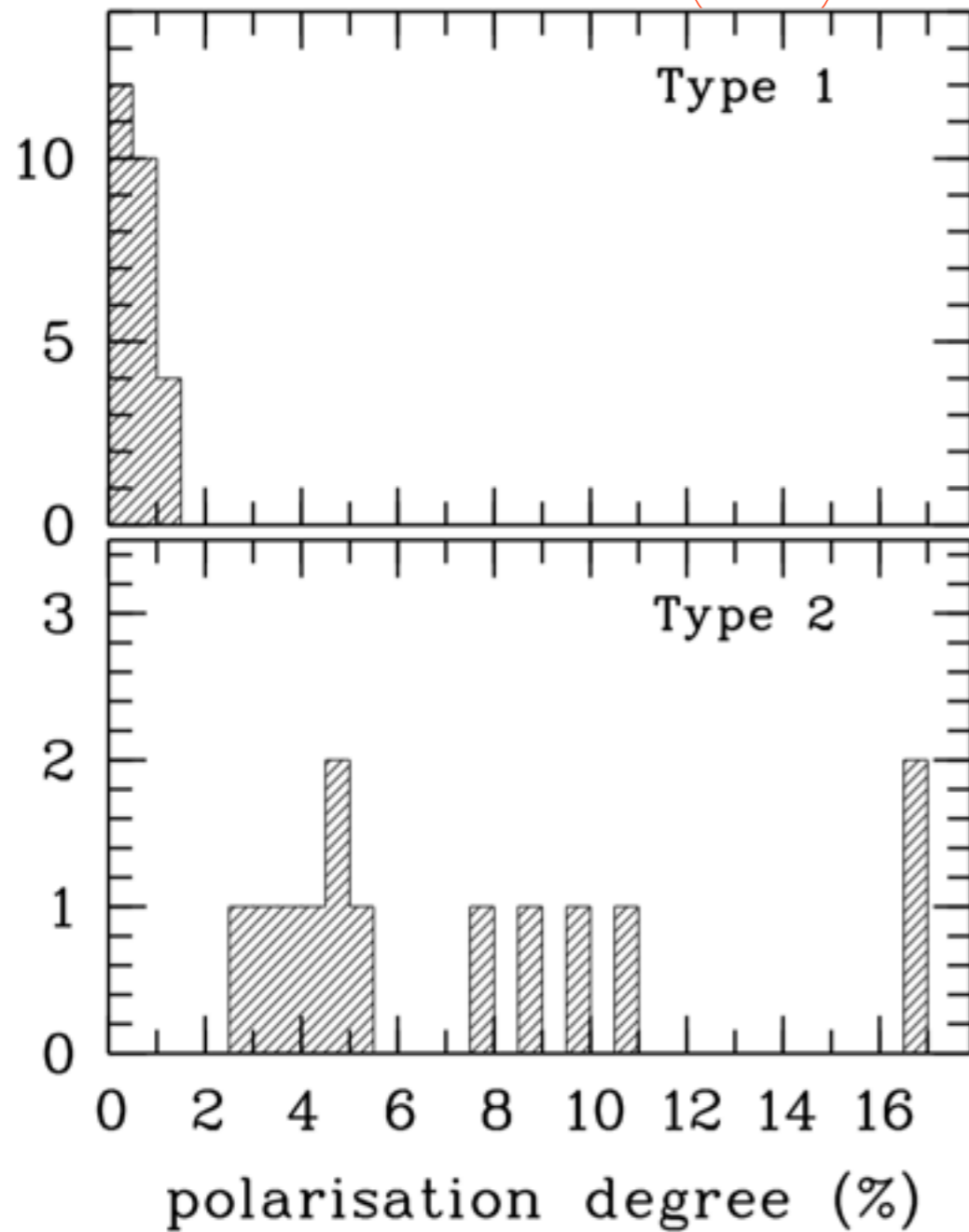
EQUATORIAL scattering dominates

POLAR scattering dominates

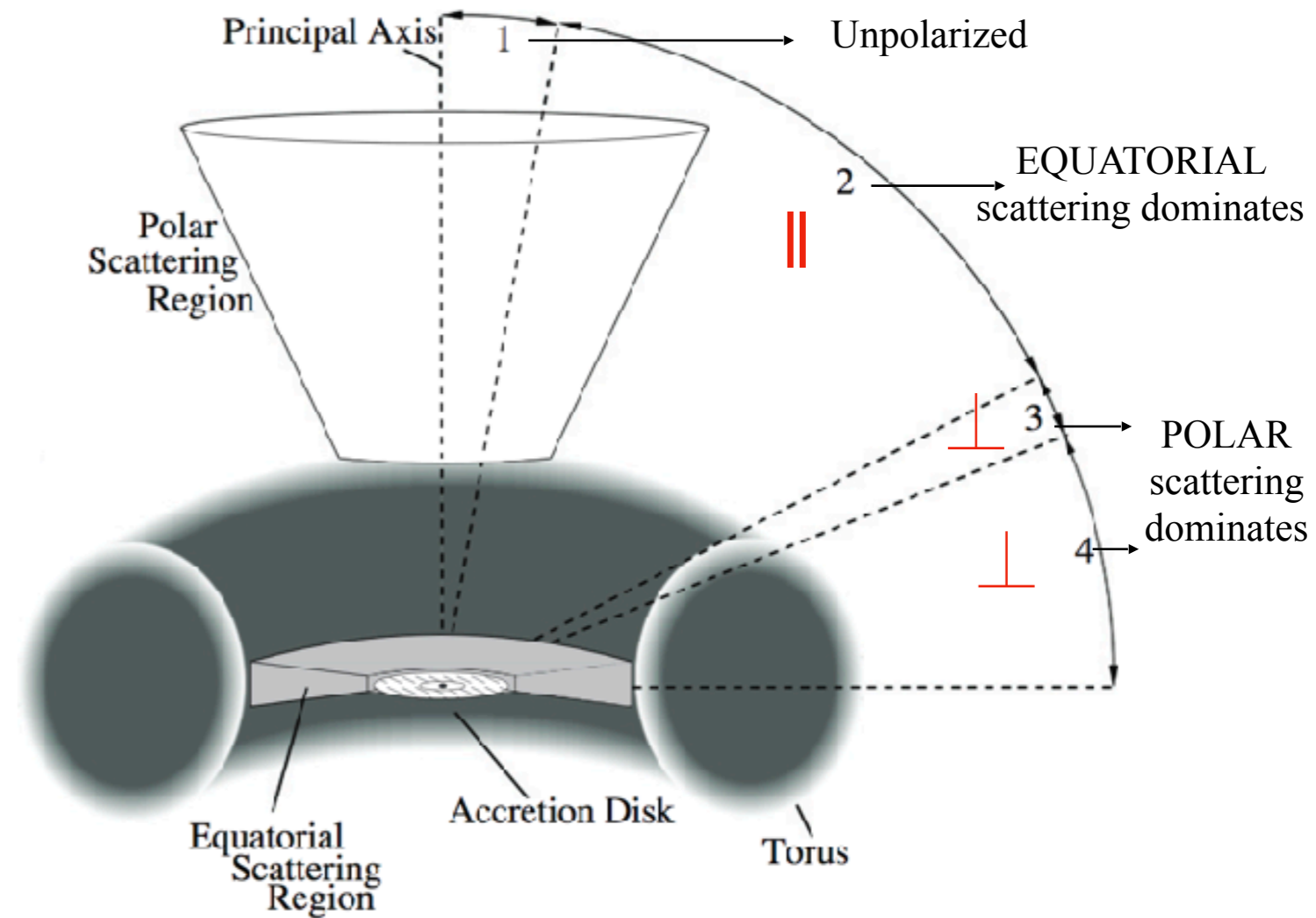
- **OPTICAL POLARIMETRY** as a changing-look tool

- DICHOTOMY TYPE-1 / TYPE-2

Hutsemékers et al. (2017)



Batcheldor et al. (2011)



- The changing-look quasar J1011+5442

Second discovered changing-look quasar by **Runnoe et al. (2016)**:
SWITCH OFF CASE - FADING BLR



- The changing-look quasar J1011+5442

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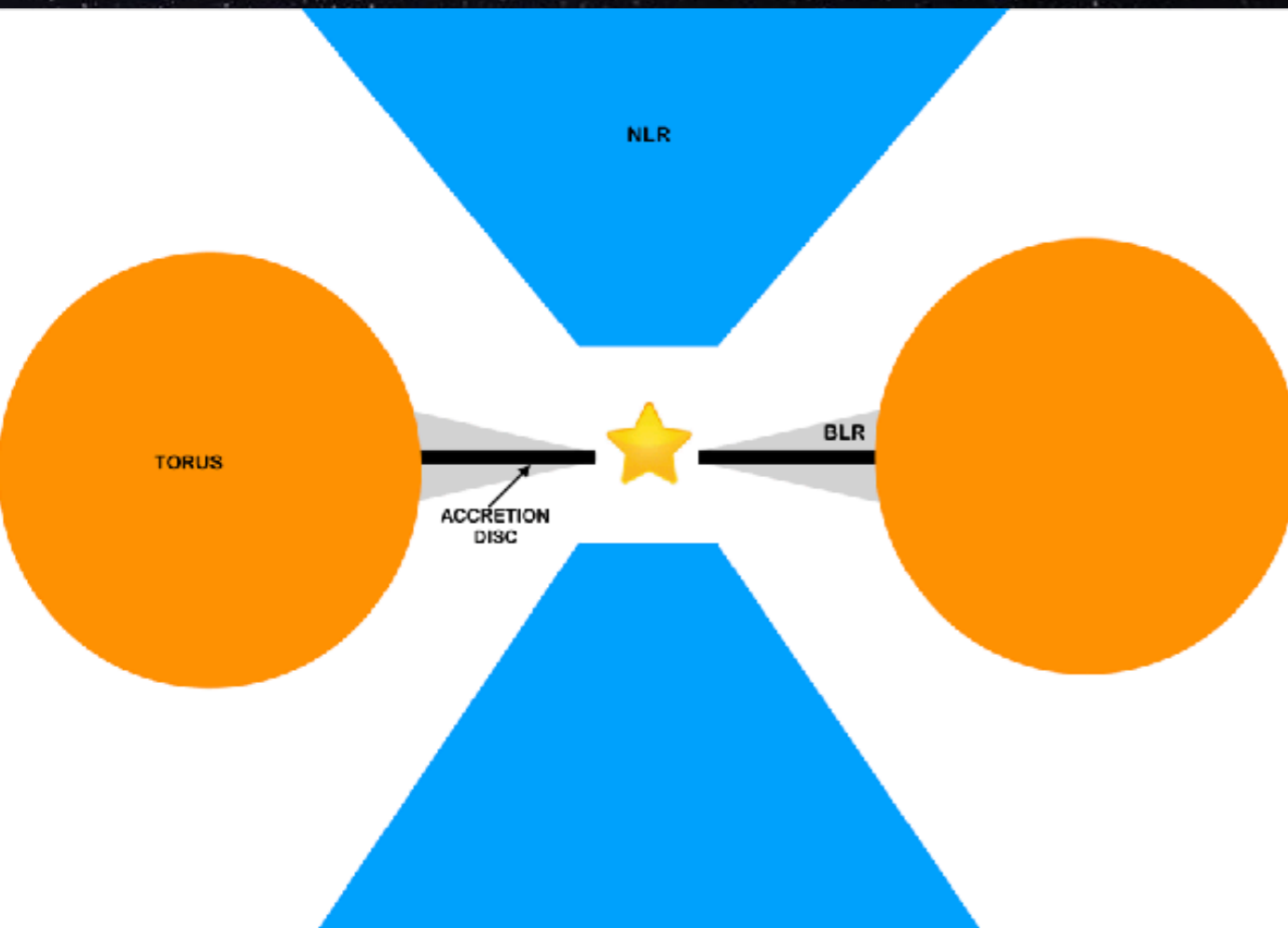
- DIASPPEARING BELs = **TYPE 1** **→** **TYPE 2** TRANSITION



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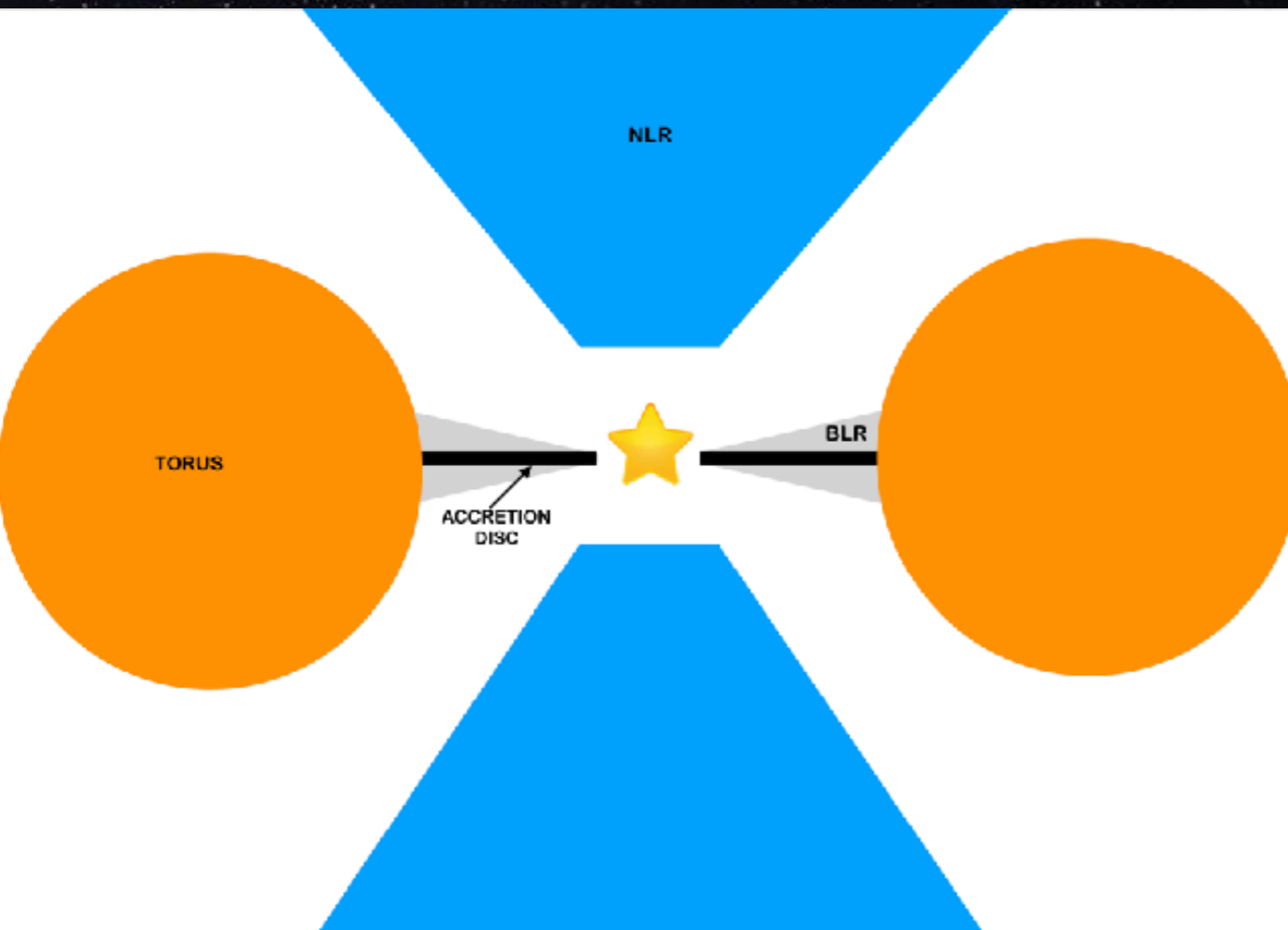
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Obscuration case

High polarization

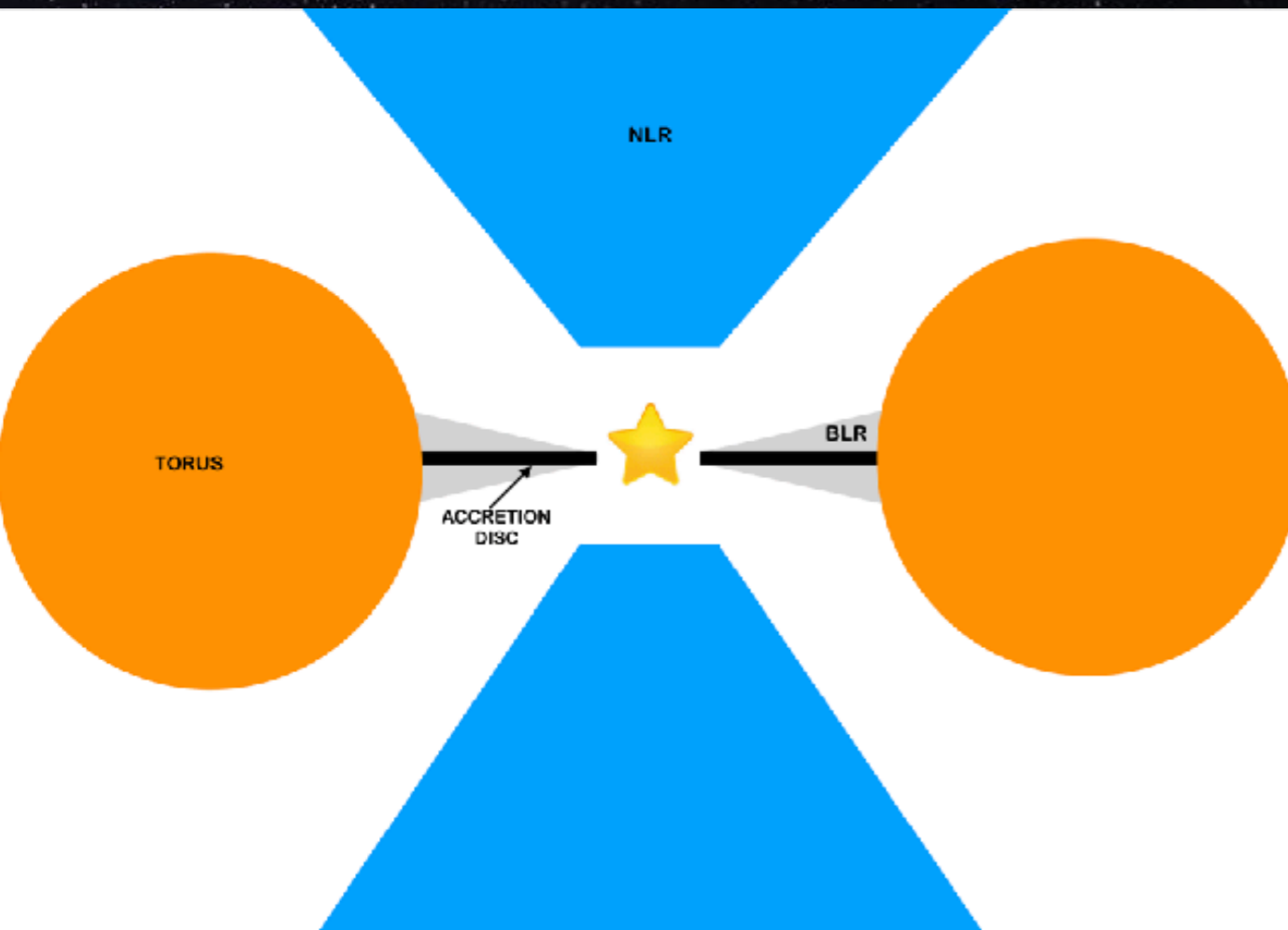
Switch off case

Low polarization

- The changing-look quasar J1011+5442

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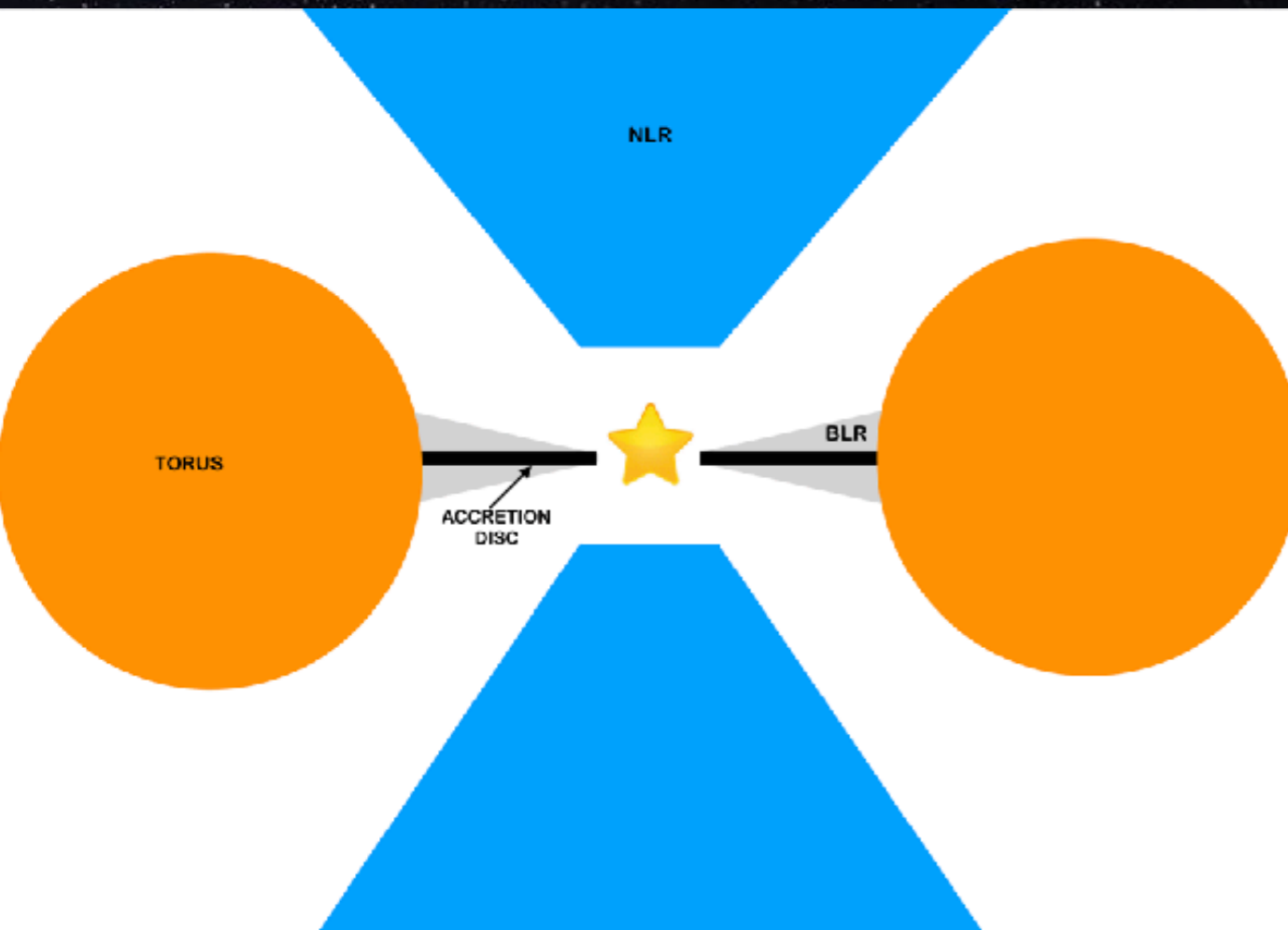
Obscuration case \longrightarrow High polarization

Switch off case \longrightarrow Low polarization

- The changing-look quasar J1011+5442

Second discovered changing-look quasar by **Runnoe et al. (2016)**:
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Obscuration case \longrightarrow High polarization

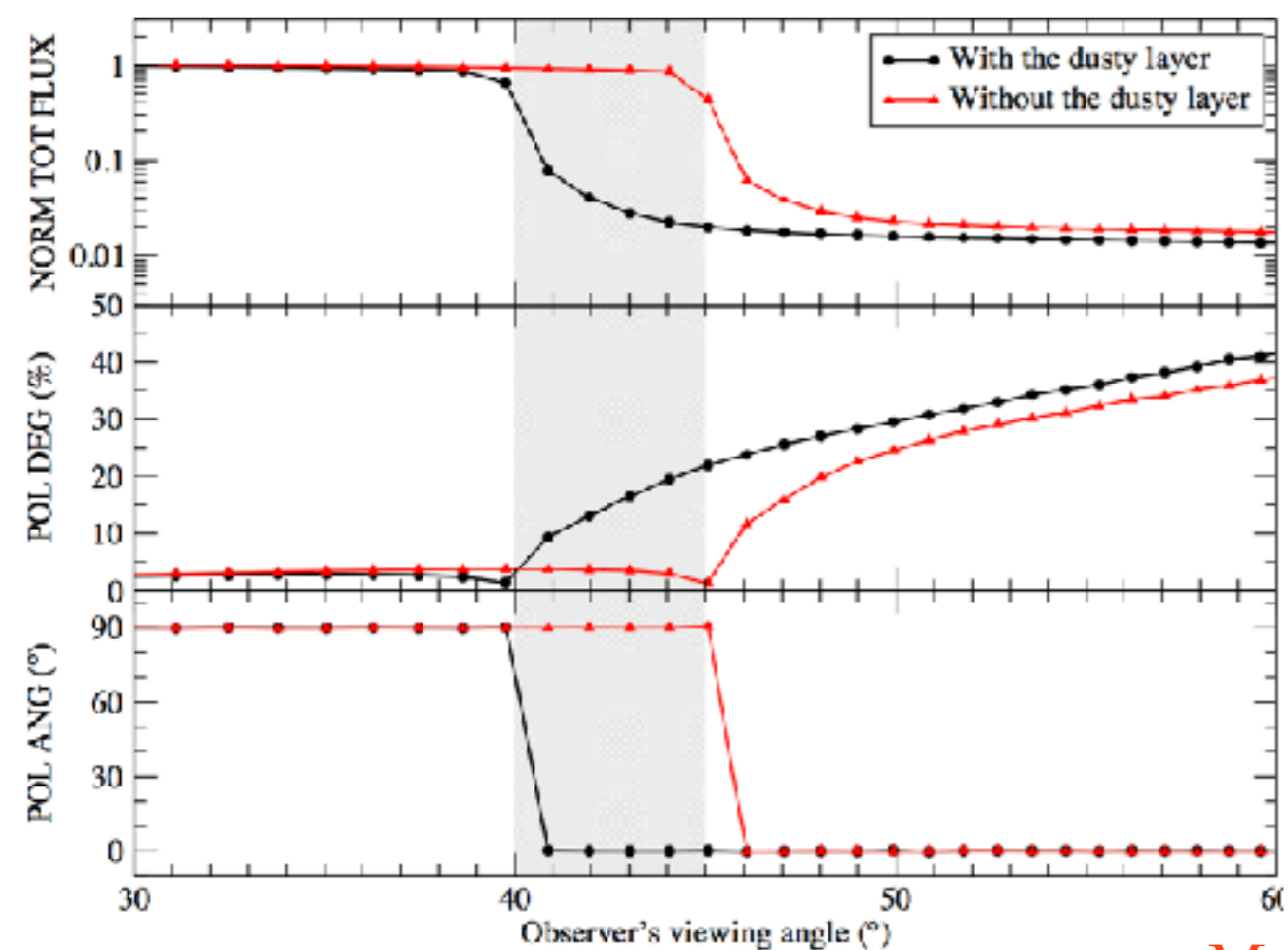
Switch off case \longrightarrow Low polarization ✓

Confirmed by a low polarization degree

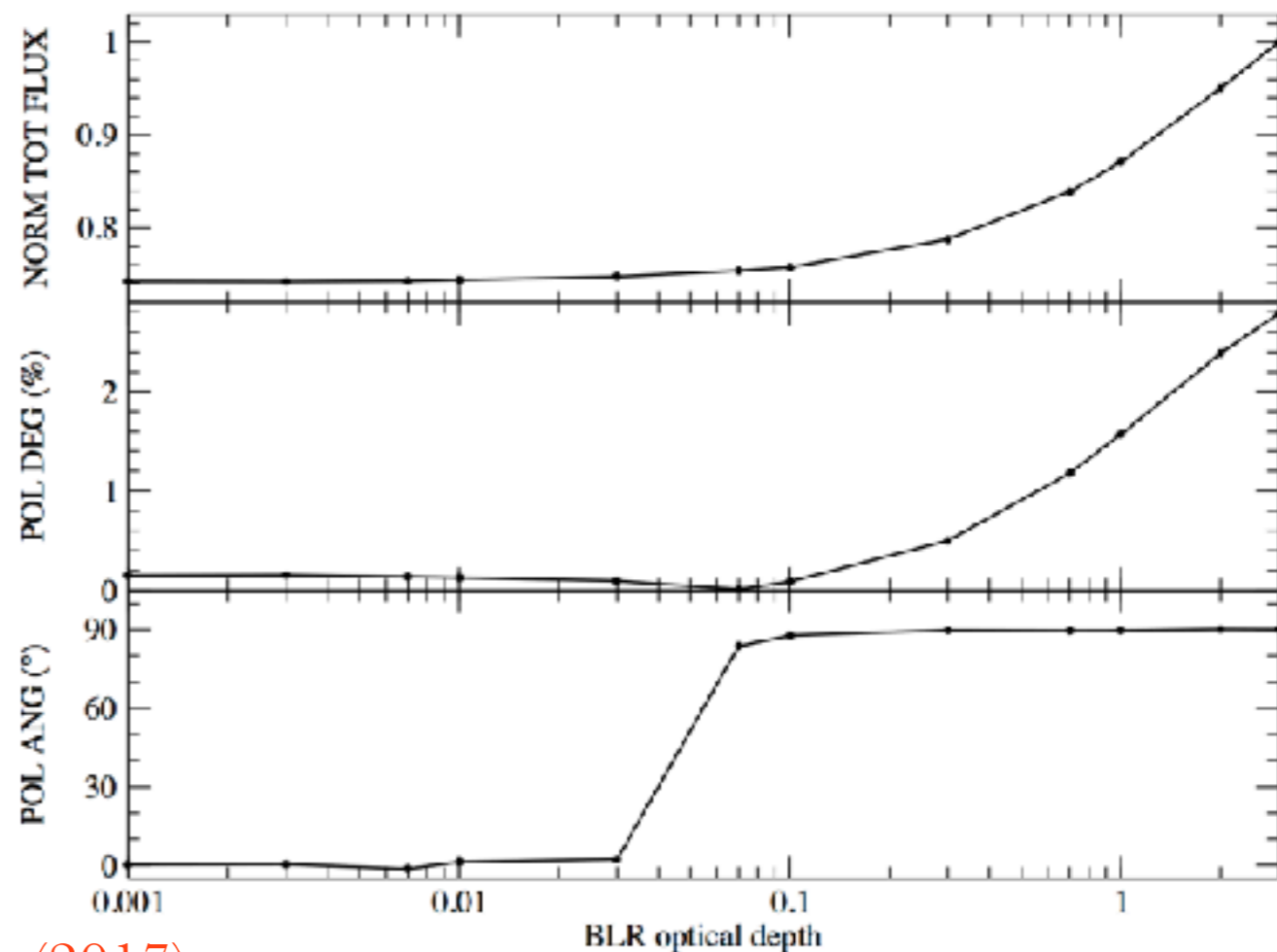
• The changing-look quasar J1011+5442

- DISAPPEARING BELs = TYPE 1 \longrightarrow TYPE 2 TRANSITION

Obscuration



Fading BLR



Marin (2017)

● FUTURE WORK

- OBSERVING THE CURRENT SAMPLE OF CHANGING-LOOK QUASARS IN POLARIZED LIGHT TO DISENTANGLE THE ORIGIN OF THE SPECTRAL CHANGES:

→ observing runs already performed in the Northern hemisphere with **ISIS@WHT** (Roque de los Muchachos, Canary Islands). DATA BEING REDUCED

→ observing runs already awarded in the Southern hemisphere with **FORS2@VLT** (Cerro Paranal, Chile)



THANK YOU !

