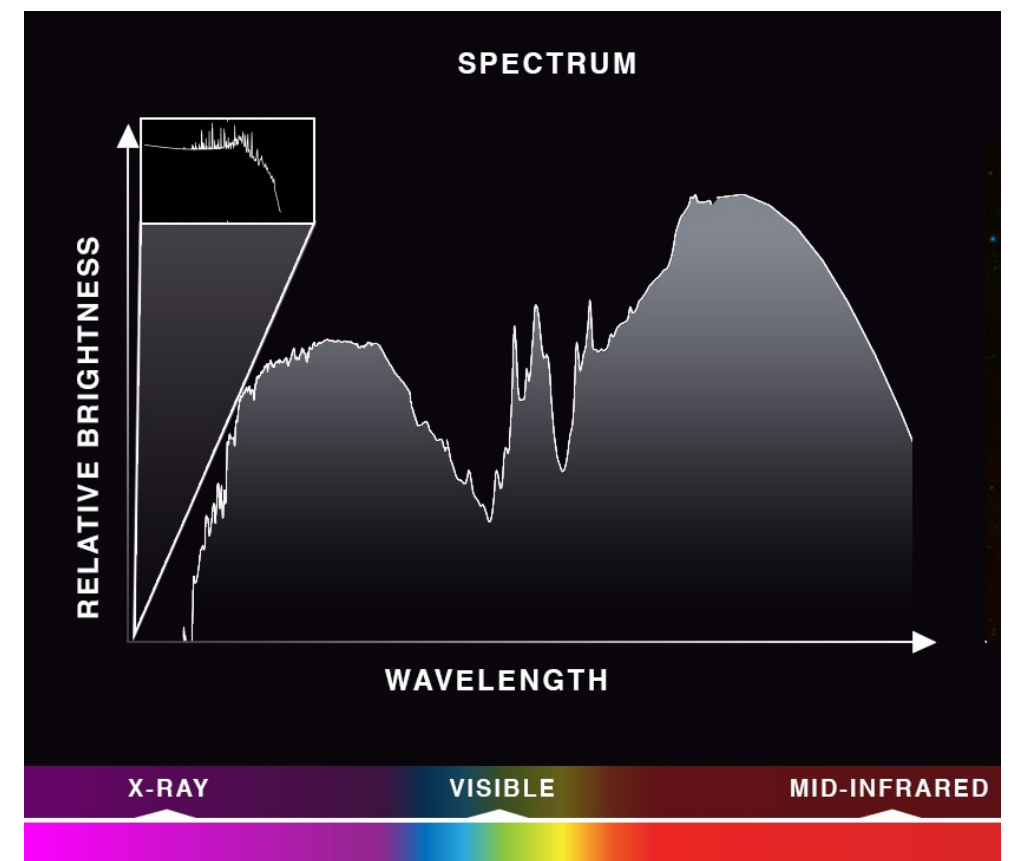


# **Mock exam**

## **Astro-III: Galaxy Formation & Evolution**

# Questions

- What is the theoretical definition of a galaxy? How can we distinguish it observationally from stars and planets?
- What is this spectrum telling you about a galaxy, which type of galaxy is it? What could you additionally learn about this galaxy if FIR and Radio would be observed?



# Questions

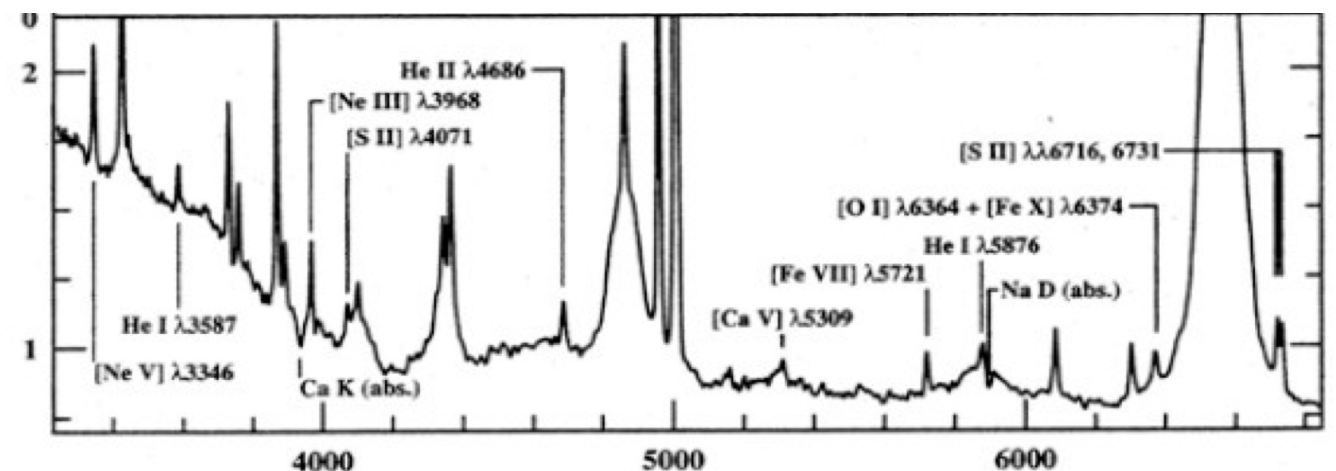
- What are the main stellar components of the Milky Way and how can we distinguish them?
- How are galaxies ordered along the Hubble sequence? What is the difference between elliptical and spiral galaxies (in addition to the obviously different morphology)?

# Questions

- What are scaling relations of galaxies, which scaling relations do you know and why are they so important for understanding galaxy evolution?
- Which large-scale structures do we observe in our Universe, what makes these environments particular? How can these structures be reconciled with the cosmological principle?

# Questions

- How can we identify high-redshift galaxies? Is photometry sufficient? What are current observations telling us about high-redshift galaxies?
- What are AGN? How can they be observationally identified? Which types do exist and how are they characterised? Which AGN type is shown by the spectra below and why?



# Questions

- What makes AGN so special? What is the Eddington luminosity of an AGN? Is this concept reasonable?
- How can energy be produced in an AGN? What is meant with “co-evolution of galaxies and BHs?

# Questions

- Why do we favour at the moment LambdaCDM as our cosmological model? Which modifications might be possible?
- Which role plays general relativity when describing the evolution of our Universe?
- How do we think that galaxies have started to form in our Universe? Why did they emerge at all?

# Questions

- Could galaxies form without the existence of dark matter?
- Which are the main physical processes affecting the formation and evolution of galaxies over cosmic time?
- If we want to model the evolution of galaxies, how can we do that?  
What is needed?

# Questions

- What were some of the main insights we got from galaxy evolution models and simulations?