

星系天文物理 資格考 2017

(可用中文作答；題號須標示清楚)

1. Answer the following questions related to the Galaxy. (20%)
 - (a) What is the total mass of the Milky Way galaxy? How much is in dark matter and how much is in stars?
 - (b) How does this total mass compare to M31 and to the LMC?
 - (c) How is this mass determined?
2. Answer the following questions related to the galaxies with black holes. (20%)
 - (a) What is the evidence that most galaxies contain nuclear black holes?
 - (b) How do those black holes interact with their host galaxies?
 - (c) How are SMBHs formed?
 - (d) What correlations are there between the properties of the SMBH and the host galaxy?
3. Answer the following questions related to galaxy formation. (20%)
 - (a) Describe the currently accepted model for the formation of various types of galaxies.
 - (b) Explain the evidence that supports this model.
 - (c) Explain 'downsizing'.
 - (d) Explain 'cold flows'.
4. Answer the following questions related to the intergalactic medium. (20%)
 - (a) How do we know that the intergalactic medium is ionized?
 - (b) Are the heavy elements such as Fe or U completely ionized, and why?
 - (c) What are the properties of the neutral H clouds? Can they form galaxies?
5. Answer the following questions related to the orbits of stars within galaxies. (20%)
 - (a) Describe the orbits of stars in a galactic disk and in a galactic spheroid.
 - (b) What orbits are allowed in an axisymmetric potential?
 - (c) How did each population of stars gain their particular orbit?