Astronomy from 4 Perspectives: the Dark Universe

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Questions: Supernova cosmology and dark energy

1. ***FLRW-models and the equation of state***

   (a) What are the ingredients (fields?) the enter into a FLRW metric?

   (b) How does each field behave as the universe expands?

2. ***Light propagation in relativity***

   (a) What is the equation that describes light propagation in a curved space-time?

   (b) How does the presence of a body exerting gravity affect light paths?

   (c) How curvature affect light propagation?

   (d) How expansion affects light propagation?

3. ***Distance measures***

   (a) How do we measure distance in a curved space-time?

   (b) What is the angular distance?

   (c) How we disentangle red-shift from curvature?

4. ***Supernova cosmology***

   (a) Why are Supernovae of Type Ia standard candles?

   (b) Why is it important to observe them at high redshift?

   (c) Why are they not enough to fully constrain the cosmology?