Master's Students Science Day Quiz

Your Name:

Group 1: Planets

Nicholas: What is the typical dimming factor of a massive planet transisting a sun-like star?

- 1/100
- 1/10 000
- 1/1 000 000

Surya: Name one atmospheric phenomenon that has fundamentally no theoretical foundation and is almost entirely characterized empirically.

- Scaterring
- Clouds
- Cyclones

Group 2: Galaxies and Simulations

Anna: How do tidal dwarf galaxies in galaxy clusters evolve?

- Stripped from their merger host, they undergo high star formation.
- Before being accreted back into the central merger, they decrease in stellar radius.
- They chill and do nothing.

Johannes: What parameter of a galaxy merger dictates whether the remnant exhibits streams or shells?

- The star formation rate of the progenitor galaxies
- The impact parameter
- The types of the progenitor galaxies

Tapan: In order to get a multiphase environment, radiative cooling at the intermediate temperatures (1e5 - 1e6 K) is necessary. What is major process contributing to the cooling at these temperatures?

- Bremsstrahlung or Free-Free Emission
- Collisional Excitation
- Recombination

Julian: What can be explained by AQNs?

- The many-worlds theory
- The observed asymmetry of matter over antimatter & the dark to visible matter ratio of ~ 5
- The age and expansion rate of the universe

Daniel: The spectrum of cosmic ray protons, which are accelerated at the shock front of a supernova remnant, is to a good approximation...

- a power-law in momentum space
- exponentially declining with increasing energy
- constant over a wide range of energies

Group 3: Extragalactic Astrophysics

Jan-Niklas: What are typical surface brightnesses of observed Tidal Streams?

- $15 - 20\text{mag/arcsec}^{-2}$
- $20 - 25\text{mag/arcsec}^{-2}$
- $25 - 30\text{mag/arcsec}^{-2}$

Leon: What kind of source cannot be lensed to arcs by a foreground galaxy?

- Quasars
- Elliptical Galaxies
- Spiral Galaxies

Sijin: Why do we choose the second wavelet filter larger than previous one?

- Doing convolution inside previous convolved area is meaningless
- Choosing a larger one means that it covers more area, and gets more accurate results
- Choosing larger one means we need to do fewer times of convolution on the field, which is less computationally expensive

Group 3: Cosmology

Naman: According to the holographic principle, information or entropy contained within a region is bounded by the...

- volume of the region.
- area of the boundary of the region.
- temperature of the region

Joy: The initial density field of the universe has been mainly shown to be...

- gaussian random fields with no parity violation.
- non-gaussian random fields with parity violation.
- non-gaussian random fields with no parity violation.