

## Questions from Nuclear Lunch presentation September 15, 2010

1. What is a brane? How does it relate to the concept of “extra dimensions”? **Sean**
2. Why can't those extra dimensions be seen by us in the macroscopic world? How small might we expect them to be? Why don't we observe particles and/or energy leaking into them? **Chen**
3. What is the Planck mass? How can it have different values? **Bijaya**
4. What is Hawking radiation? Has it ever been observed? **Shamim**
5. What is the Hawking temperature? How is it related to the size of a black hole? What does this tell us about black-hole evaporation? **Dilu**
6. What are the differences between astronomical black holes and quantum black holes in
  - a. Mass
  - b. Temperature
  - c. Escape velocity? **Sushil**
7. How do proton-proton collisions at the LHC result in quantum black holes? What is the cross section for that? Is this small compared to other LHC cross sections? **Ken**
8. How does a quantum black hole evolve with time? Why does it lose all its charge and spin before it loses all its mass? **Anton**
9. Once created at the LHC, do black holes exist forever? Do they then eat the materials around them? **Cody**
10. How does the black-hole mass relate to the beam energy? How does a black hole produced at the LHC decay (at least according to the Dimopolous-Landsberg paper)? **Harsha**
11. Assuming it did not eat the Earth (!), how would we know that a black hole was produced at the LHC? In particular, how does one distinguish between decay products from a black hole and particles produced from all other sources? **Daniel S.**
12. How would an LHC-produced black hole's total mass be measured? **Nowo**
13. How does one tell from the LHC experiment discussed in the Dimopolous-Landsberg paper if there are space dimensions beyond the three that we perceive? **Youngshin**
14. Should the emphasis at the LHC be on discovering black holes? Or on putting that discovery to use for finding out other things? **Bing**
15. If quantum black holes exist in the universe, why didn't we observe them yet? **Anthony**
16. Why is the radiation emitted from astrophysical black holes usually depicted as emerging along a vertical axis? **Daniel P.**