

PHY-105: Project Ideas

One of the course requirements will be an independent project of your choosing. This is to be submitted in paper form by Friday April 22. You should plan to start early as you'll be expected to conduct a significant amount of research on your project. It is expected your project paper will contain a clear introduction of your topic, at a level understandable by your classmates, and be a total of between 15 and 20 pages in length.

Some project ideas, broken up into three main categories:

- On Composition of the Universe:
 - What is Dark Matter and can we detect it ? This could either be a survey of the current understanding of Dark Matter, or a more detailed look at a particular experiment that is looking for Dark Matter.
 - What is the origin of ultra-high energy Cosmic Rays ?
 - What is the origin of Cosmic-Ray bursts ?
 - What is Dark Energy ?
 - What is the origin of the matter-antimatter asymmetry ? (without which we wouldn't exist!)
 - The search for Earth-like planets – how its done, status of searches, probability for life on them
 - Observational astronomy project – look into what telescopes are available via the web.
- On the evolution of the Universe:
 - How did galaxies form (and clusters, and superclusters) ?
 - How did Dark Matter evolve and what is its distribution ?
 - What are super-massive black-holes, where are they found, and how did they form ?
 - Was Friedmann right ? (that is, can the evolution of the early universe via the Friedmann equations (we'll cover this) explain current observations ?)
- On the origins of the Universe:
 - Was there anything before the big-bang ?
 - Are there extra-dimensions and what purpose do they serve ?
 - Did the Universe inflate ?
 - What is the origin of CMB anisotropies ?

These are just suggestions to get you thinking. You are free to choose a different question/topic, but discuss with me or Kevin Finelli first.