SEMINAR IN PHYSICS

FRIDAY, February 12, 2016

3:30-4:25 · Ross 0220

~ Refreshments! ~

The Fundamentals of Radio Astronomy

Daniel Herrera, UNC Physics student

Karl Jansky first discovered the so called "noise from space" in 1933. After confirming that the signal was in fact not from the sun, he determined that it came from the Sagittarius constellation. This finding sparked the interest of radio engineers and soon the first radio telescope was made by Grote Reber. The dish measured 9.5 meters in diameter, and Reber carried out the first sky survey in the radio frequencies. Thirty years later, the Arecibo Observatory, the largest single-aperture telescope in the world, located in Arecibo, Puerto Rico, was built with a diameter of about 305 meters or 1000 ft. The technological leap of the last few decades has allowed professional research entities to obtain the clearest radio observations to date. These advancements also allow the amateur astronomer to create a basic, low-cost radio telescope that can serve as an entry point to radio astronomy.

The Physics of Flight

Seamus Severance, UNC Physics Student

Human flight has become a huge part of our world in the past 100 years. Having the ability to fly anywhere in the world quickly had been a game changer, yet most people don't know how flight works. I will discuss the physics of an airplane. The idea that Bernoulli's principle is the key is wrong. We will discuss what the correct explanation of flight is. Newton's Third Law is the key to flying. The other part of flying is the propulsion systems used most commonly, and I will also cover the aerodynamics of what causes those to be successful. Jet engines and propeller airplanes are complicated and yet simple at the same time.

Superconductors and the Meissner Effect

Arick Sweitzer, UNC Physics Student

In physics there exist five main states of matter: plasma, gas, liquid, solid, and Bose-Einstein Condensate (BEC's). Superconductors fall into the realm of BEC's, as they are achieved through lowering the temperature of a superconductive material to extremely low temperatures. Superconductors are characterized by their unique characteristic to provide zero electrical resistance. When a material undergoes the phase change to its superconductive state, it experiences a phenomena known as the Meissner Effect. The Meissner Effect is the complete expulsion of magnetic flux from within the superconductor, which allows for unique magnetic interactions and phenomena, such as magnetic levitation.