

SEMINAR IN PHYSICS

FRIDAY, May 1, 2015

3:30-4:25 • Ross 0220

Last Chance for Pizza This Year!!

Creating a Robot Swarm

Lee Ismay (UNC Physics Student)

This project will investigate swarm behavior using a collection of selectively coupled microprocessors (Arduinos). A system of elements is considered to swarm when displaying a collective behavior based on the interactions of individual elements without central organization. This is interesting as it can be difficult to predict the nature of this collective action even though one fully understands the interactions of the individuals.

I am developing a mathematical model of swarm behavior that can be applied to robotics. For this model, mutual interactions that are beneficial in some way to the communicating elements will bias the group to swarm. Once this model has been created, a program will be written that allows a group of Arduinos to swarm. Each Arduino would only communicate with one other yet, via this program, the group will synchronize and perform the same task.

Information Preservation in Black Holes

Tre Tellez (UNC Physics student)

Information was first theorized by Stephen Hawking and Jacob Bekenstein to be lost to a singularity when a black hole is evaporated. This theory violated information conservation as implied by a principle of quantum mechanics -- unitarity. The violation of unitarity is due to the loss of information beyond an event horizon. To resolve the problems of an event horizon and loss of information, several theories (which refute one another) motivate for further research.