### Sample Proposal for the QuarkNet High School Student Component

**Date: November 15, 2008**

**QuarkNet Center**
University of Notre Dame

**Mentors *(Give phone number for lead mentor for this project)***
Dan Karmgard 574-631-4737 and Mitch Wayne

**Your Plans**
We will recruit 4 high school juniors who will be testing waveshifting and scintillating materials for optical properties for potential use in the Linear Collider.

One project will have students tapering the ends of optical fibers in order to take advantage of the critical reflection angle and determining how to use it for optimal optical properties. Another project involves determining the timing for ganged scintillating tiles on a single optical fiber using cosmic rays or Ru106.

There will be one hour each day for discussion or more formal instruction about the projects, the Linear Collider, the university or particle physics.

**Role of the Research Teacher**
The research teacher will work on the ODU threading with the students and one technician. The team approach will allow the students to see how physics research is actually done. The teacher will be responsible for safety, paperwork, and parental contact as it pertains to the students. All of the Notre Dame QuarkNet teachers will help select the students for this project.

**Training Needed**
The students will be trained in the use of equipment, e.g., oscilloscopes. Students will attend radiation safety training and informed about the radioactive sources in that lab.

**Safety Considerations *(Remember these are minors!)***
We have contacted the Office of Risk Management about hiring minor children. This might require extra paperwork. Since the students will be using Ru106, radioactive sources will be moved and monitored by an adult (teacher, technician, physicist, etc.). We will provide film badges to record any radiation they might be exposed to. (Our intent is that they will not be exposed to any radiation.)

**Transportation**
The students are local, so they drive or are dropped off at the lab each day.

**Housing (QuarkNet does not provide money for this)**
N/A - local students

**Any other information**
Notre Dame has successfully piloted this program for the since 1999.