SRF Technology

- Purpose—use electromagnetic fields to accelerate charged particles
- Niobium cavities
Uses of SRF

- Radiotherapy: 44%
- Ion Implantation: 41%
- Industrial Processing and Research: 9%
- Biomedical and Low-Energy Research: 4%
**SRF Cavities**

- Donut-shaped
- Niobium (Nb)
- Covered in liquid He, insulated vacuum
- RF Antenna excites EM fields

- Particles accelerated—electric fields
- Particles deflected—magnetic fields = tight beam
Optical Inspection System (OIS)
OIS Continued

IR1-3 Cavity

Camera with Long Distance Microscope
My Project – Part One

- Automate the OIS using stepper motors
  - Move light/mirror apparatus or the cavity
  - Rotate cavity
My Project-- Part Two

- Use MATLAB to create a program-- view images of cavity surface
What I’ve Done so Far

- Learned to use OIS
  - Took pictures of a single-celled cavity, and LR1-3
- Made a program that uses angles to locate an image
Why is My Project Important?

- Achieve higher accelerator gradients
- Cavities with consistent, high gradients are needed for projects—ILC
- Defects limit SRF cavities
Goals for the Summer

- Complete my project
- Stay out of Nick’s hair
- Learn something
- Have fun!!