



Optical SRF Cavity Inspection

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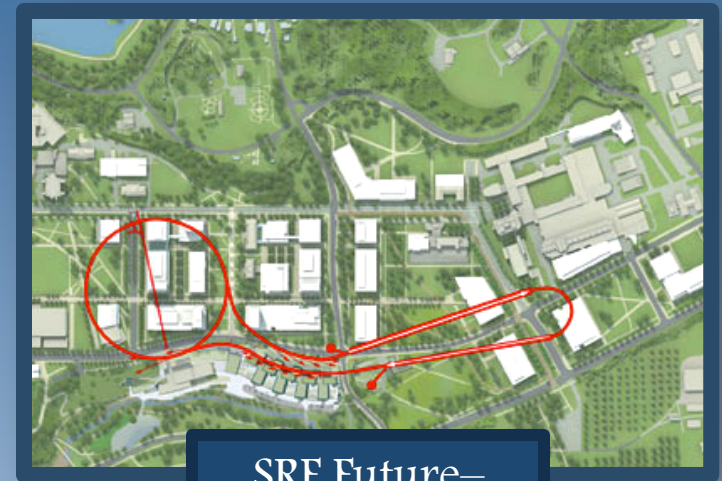


SRF Technology

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

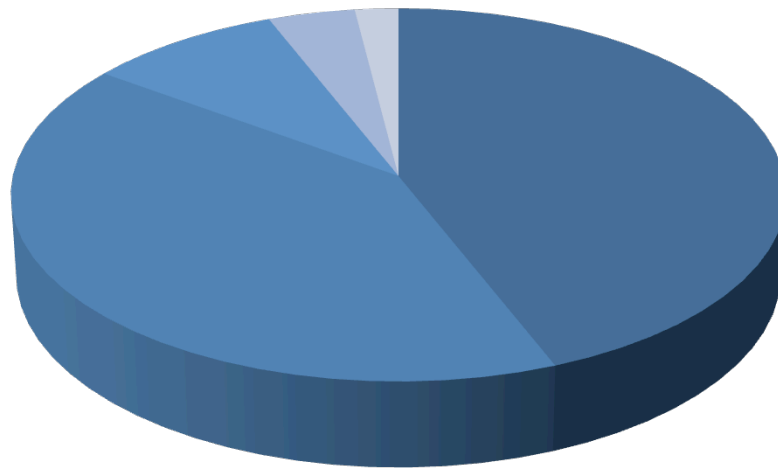


SRF Now—
Synchrotron



SRF Future—
ERL

Uses of SRF



■ Radiotherapy 44%

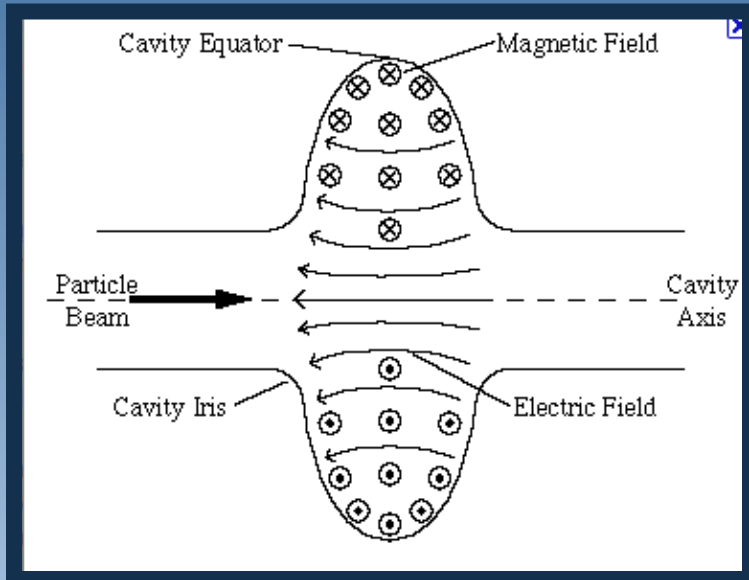
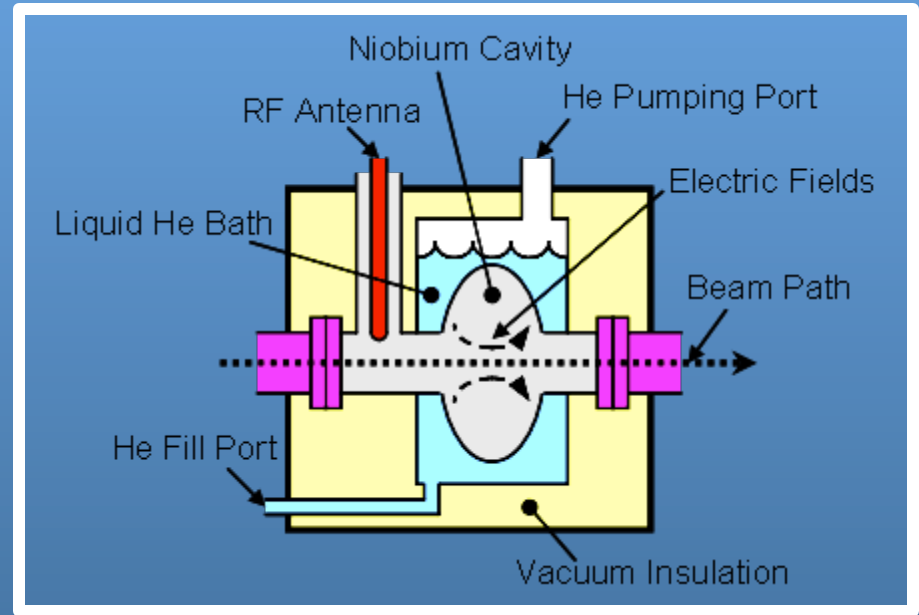
■ Ion Implantation
41%

■ Industrial
Processing and
Research 9%

■ Biomedical and
Low-Energy
Research 4%

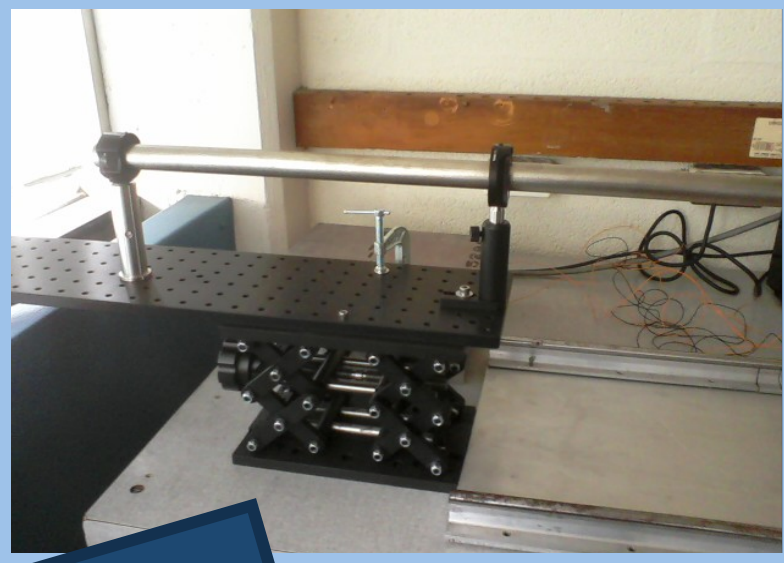
SRF Cavities

- 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

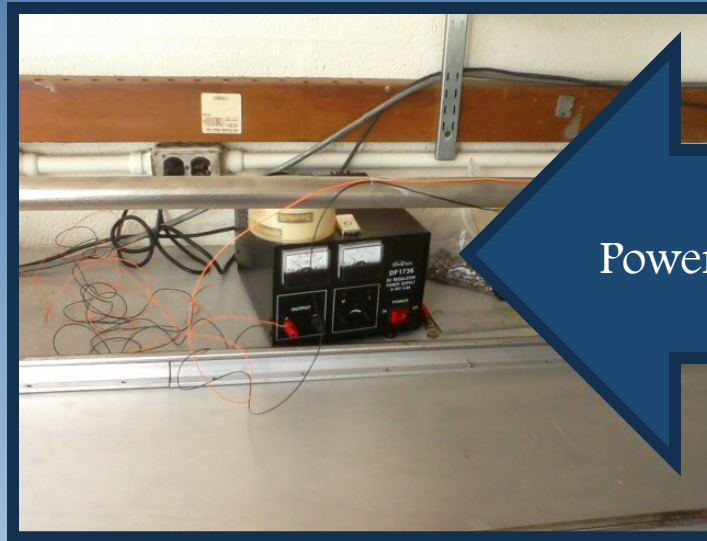
Optical Inspection System (OIS)



Light/Mirror
Stand



Light/Mirror

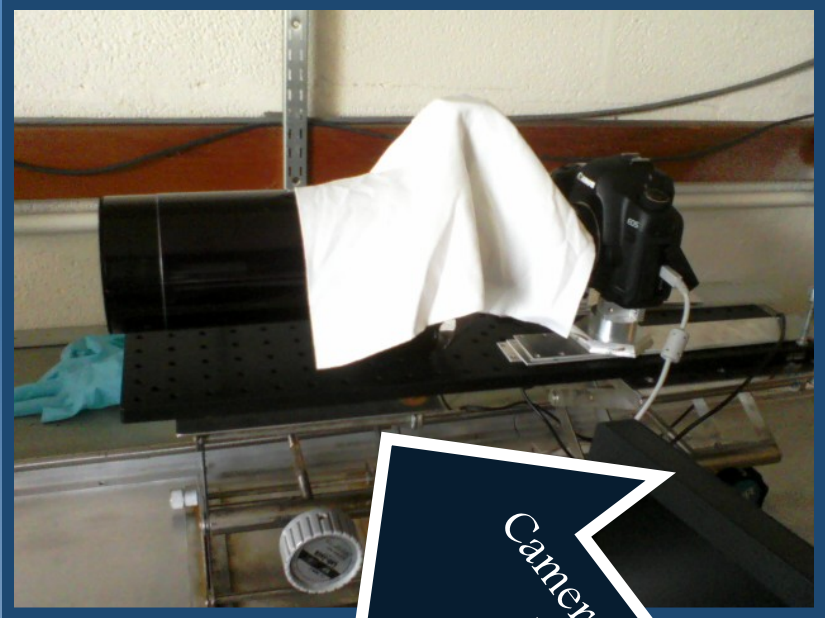


Power Supply

OIS Continued



LR1-3 Cavity



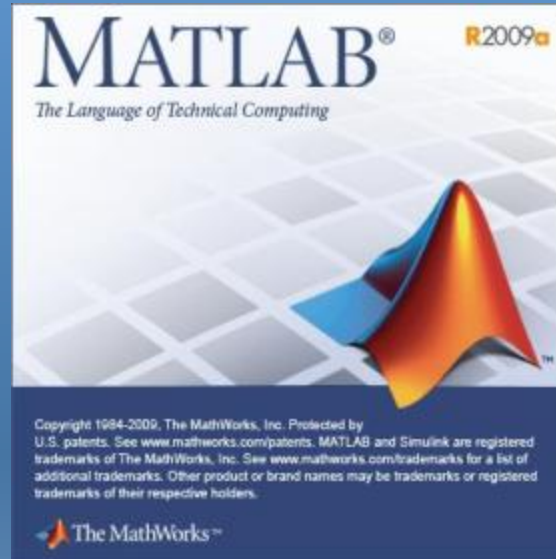
Camera with Long
Distance
Microscope

My Project— Part One

- Automate the OIS using stepper motors
 - Move light/mirror apparatus *or* the cavity
 - Rotate cavity



My Project— Part Two



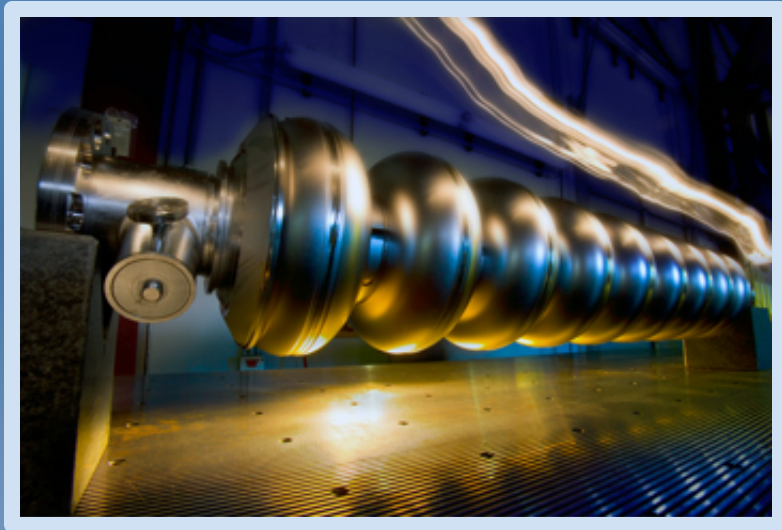
- Use MATLAB to create a program— view images of cavity surface

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!!

