

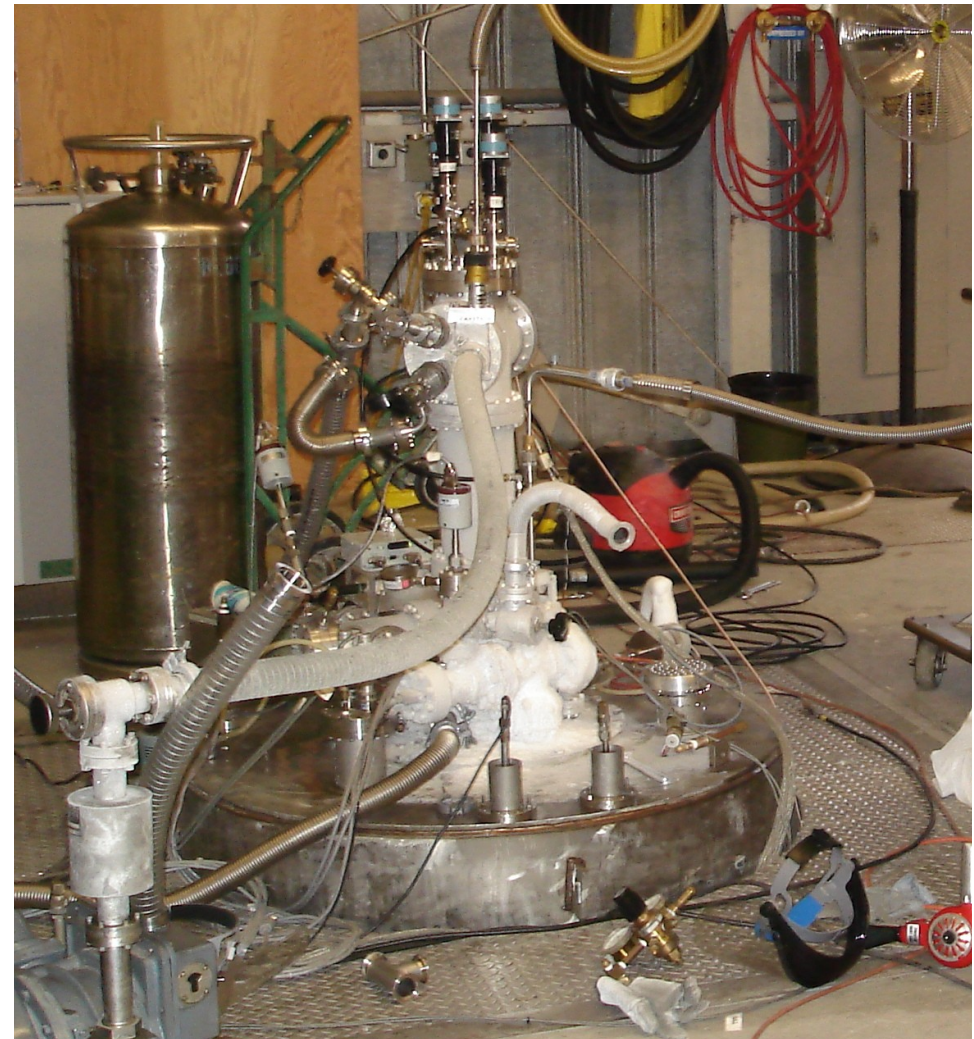
# ADMX Medium Resolution Analysis

2/14/2010

April APS, Washington D.C.

Michael Hotz

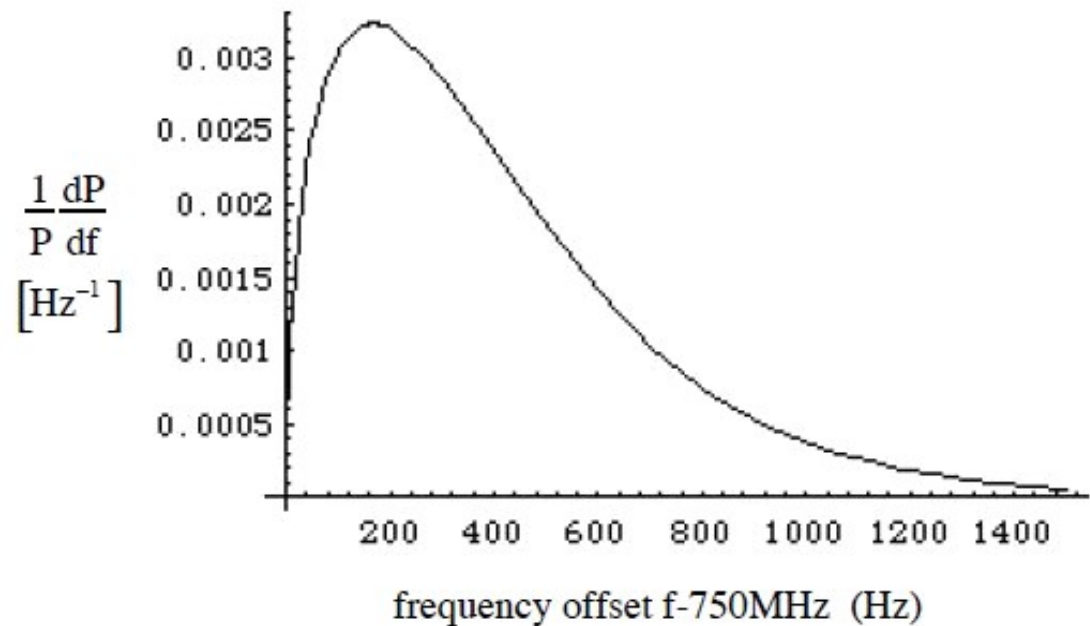
University of Washington



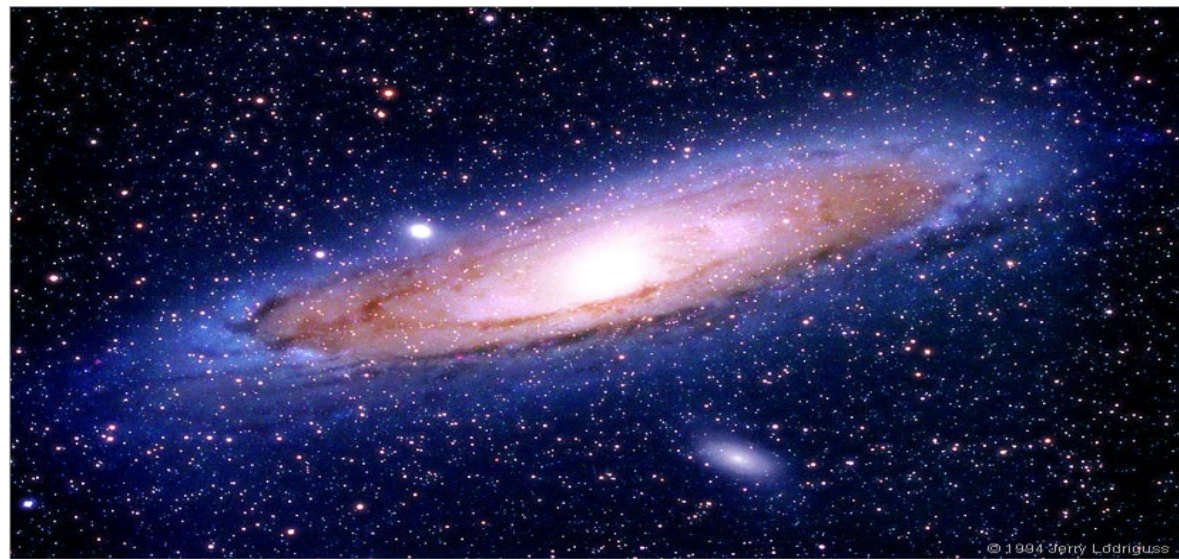
# A Galactic Axion Halo

Virialized Halo:

- CDM axions interact gravitationally with themselves and normal matter
- Over billions of years, axions virialize, generating a smooth halo velocity distribution

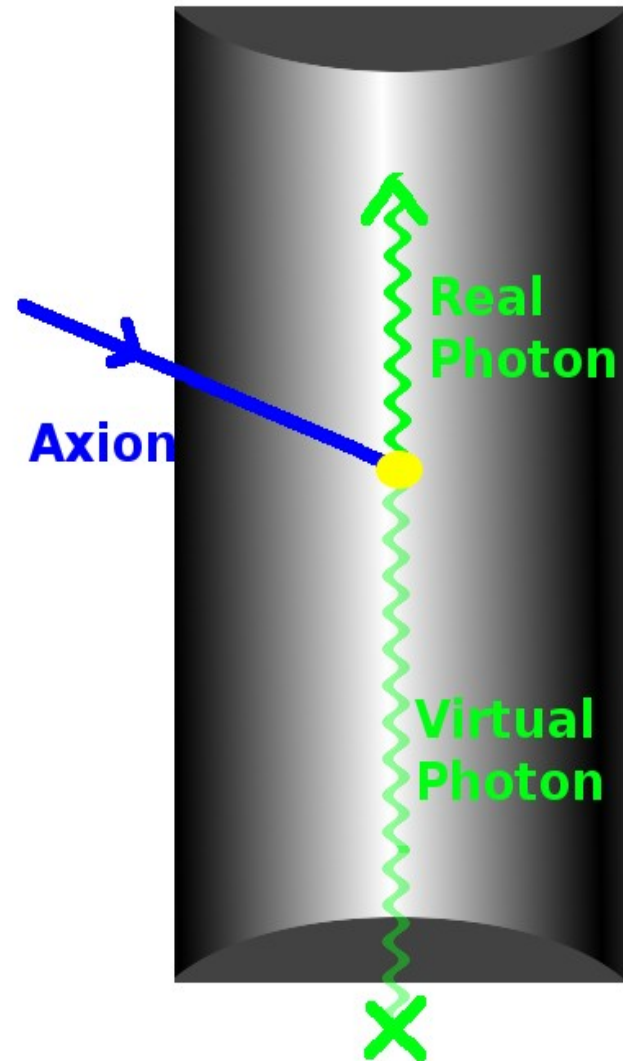


ADMX's medium resolution analysis assumes that the  $3 \text{ GeV/cc}$  local halo density is entirely virialized.



# ADMX Principle

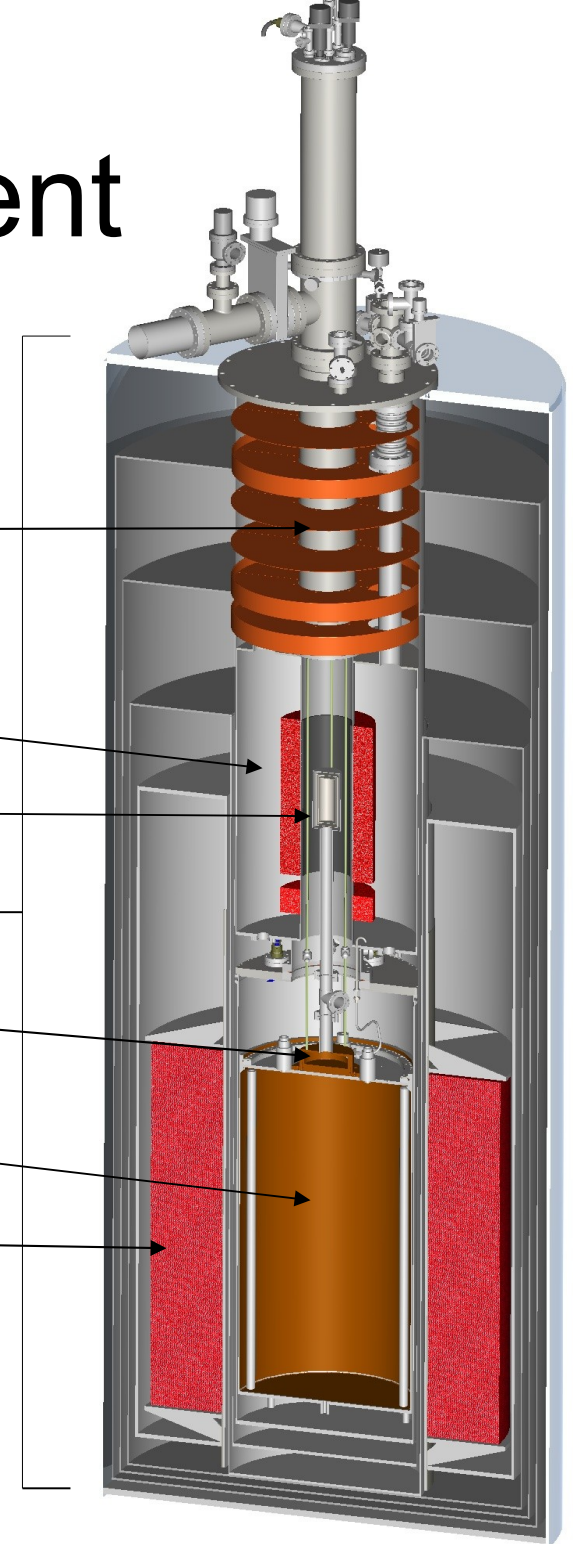
- Halo axions enter cavity
- Axions scatter off B field
- Resonantly convert to microwave photons
- Excess photons observed above thermal noise



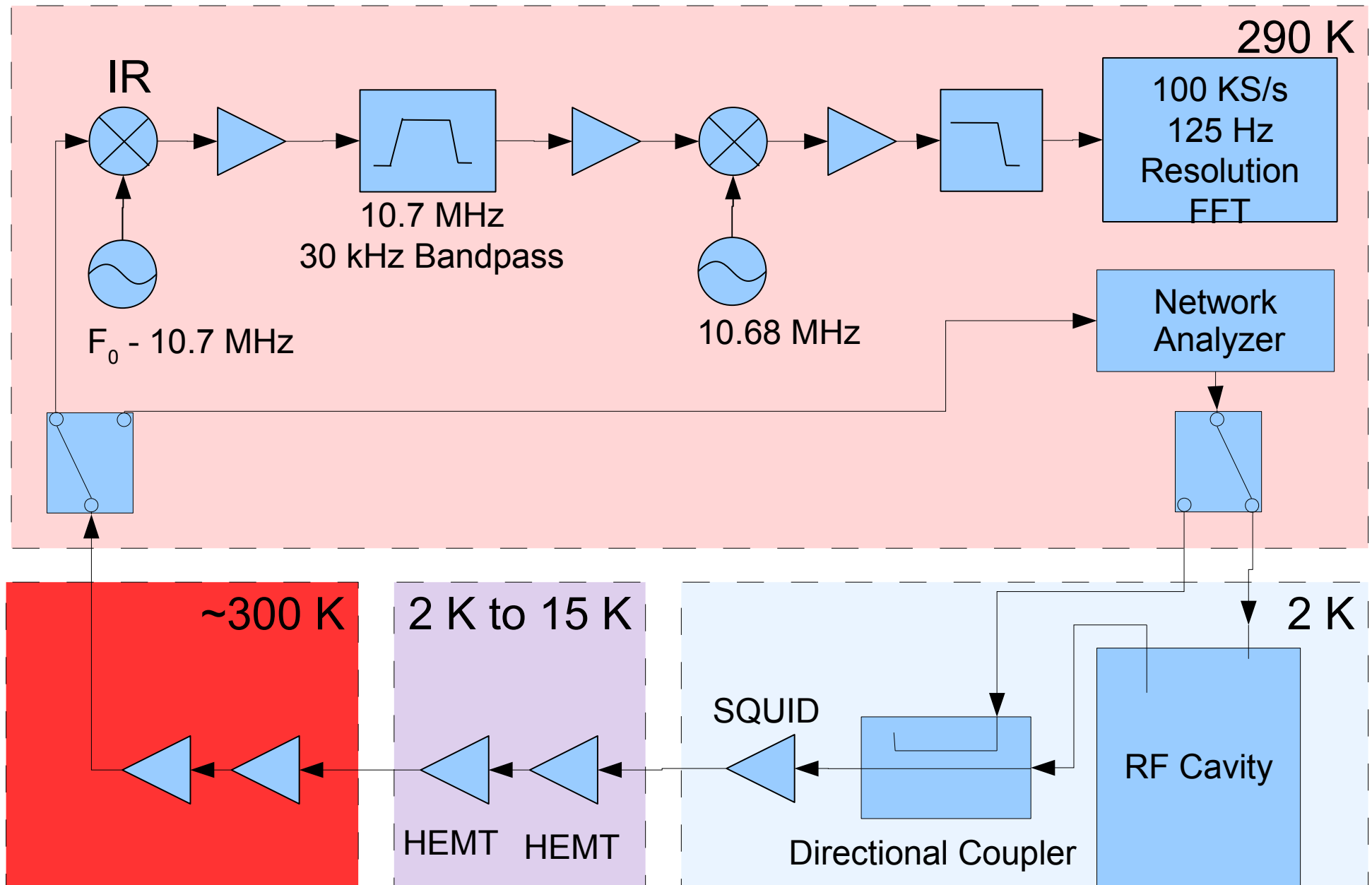
# ADMX Experiment

- Baffling
- Bucking Magnet
- SQUID
- 1K Pot
- Microwave Cavity
- Main Magnet
- 13 Ton

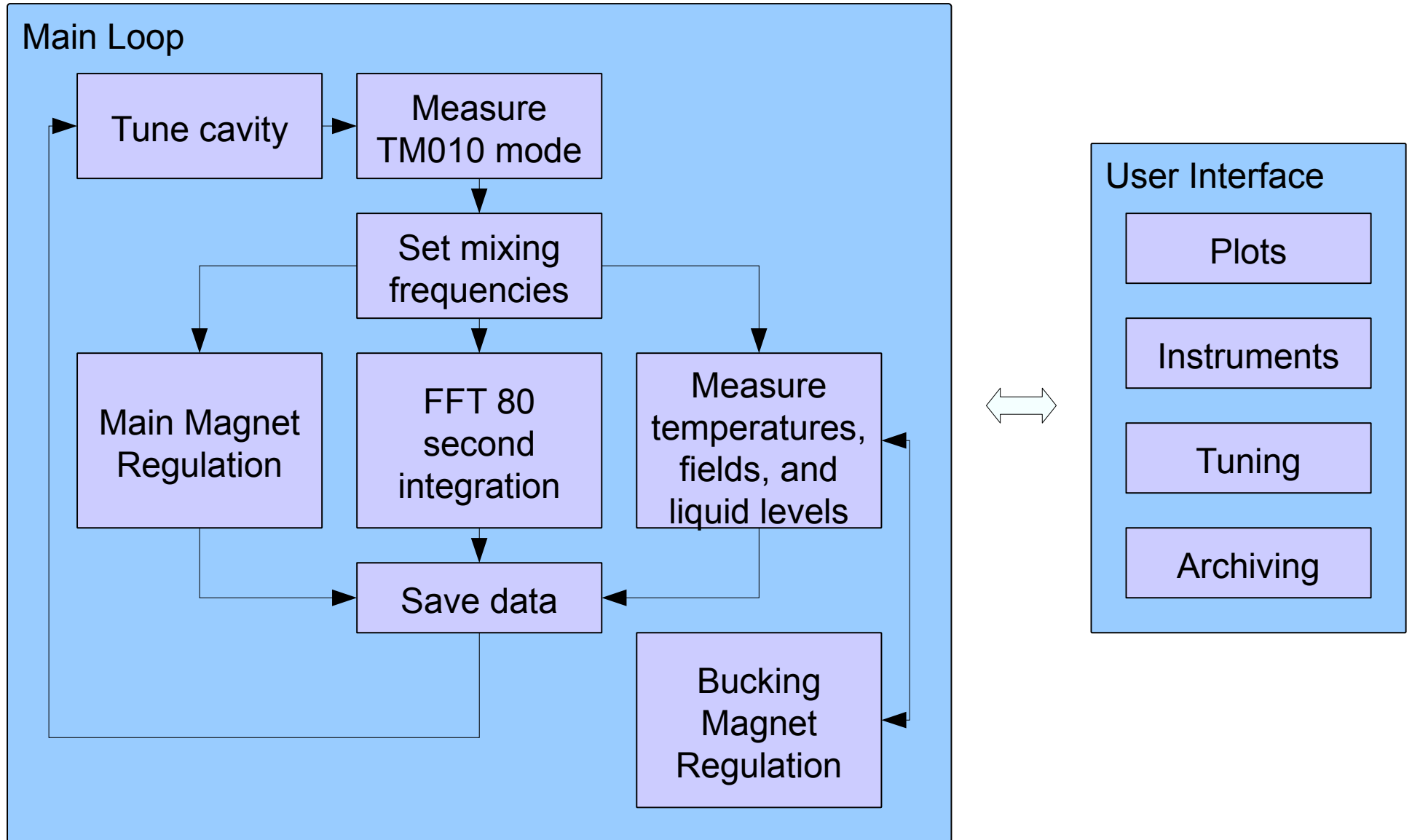
4 m



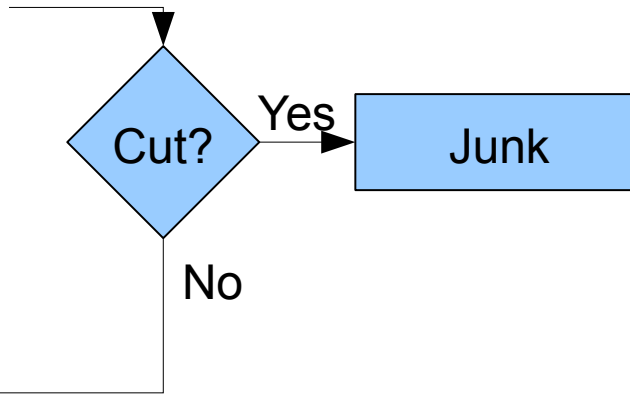
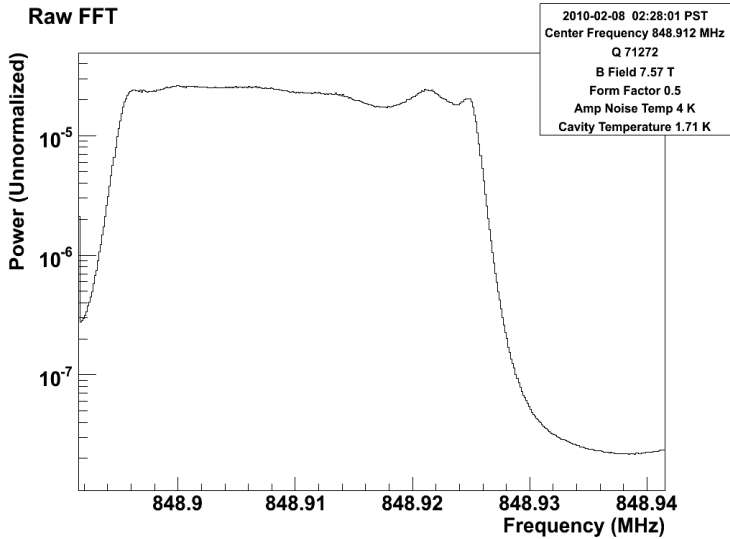
# ADMX RF System



# ADMX DAQ

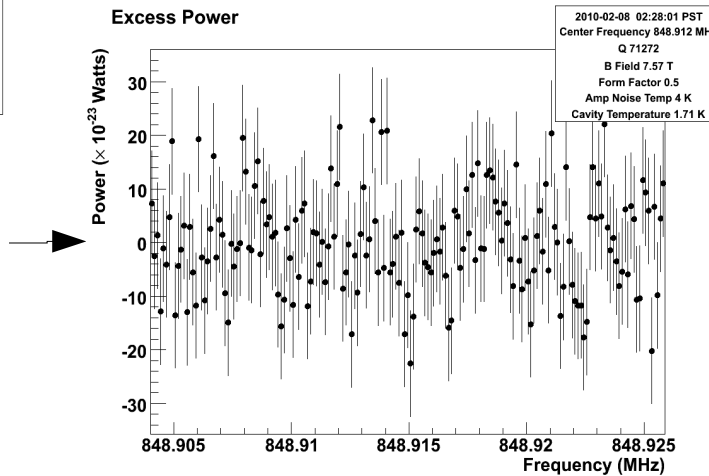
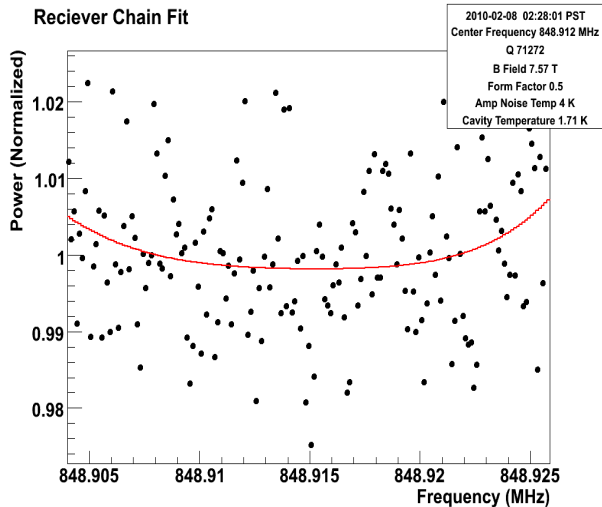
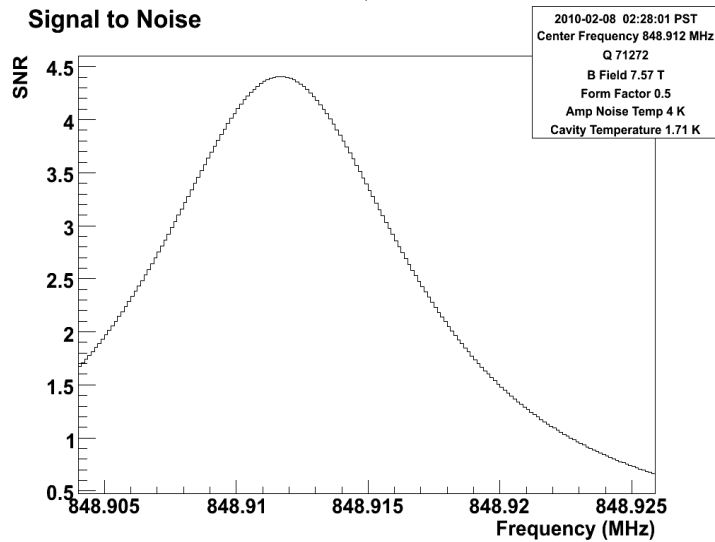


# FFT Power Spectrum Processing

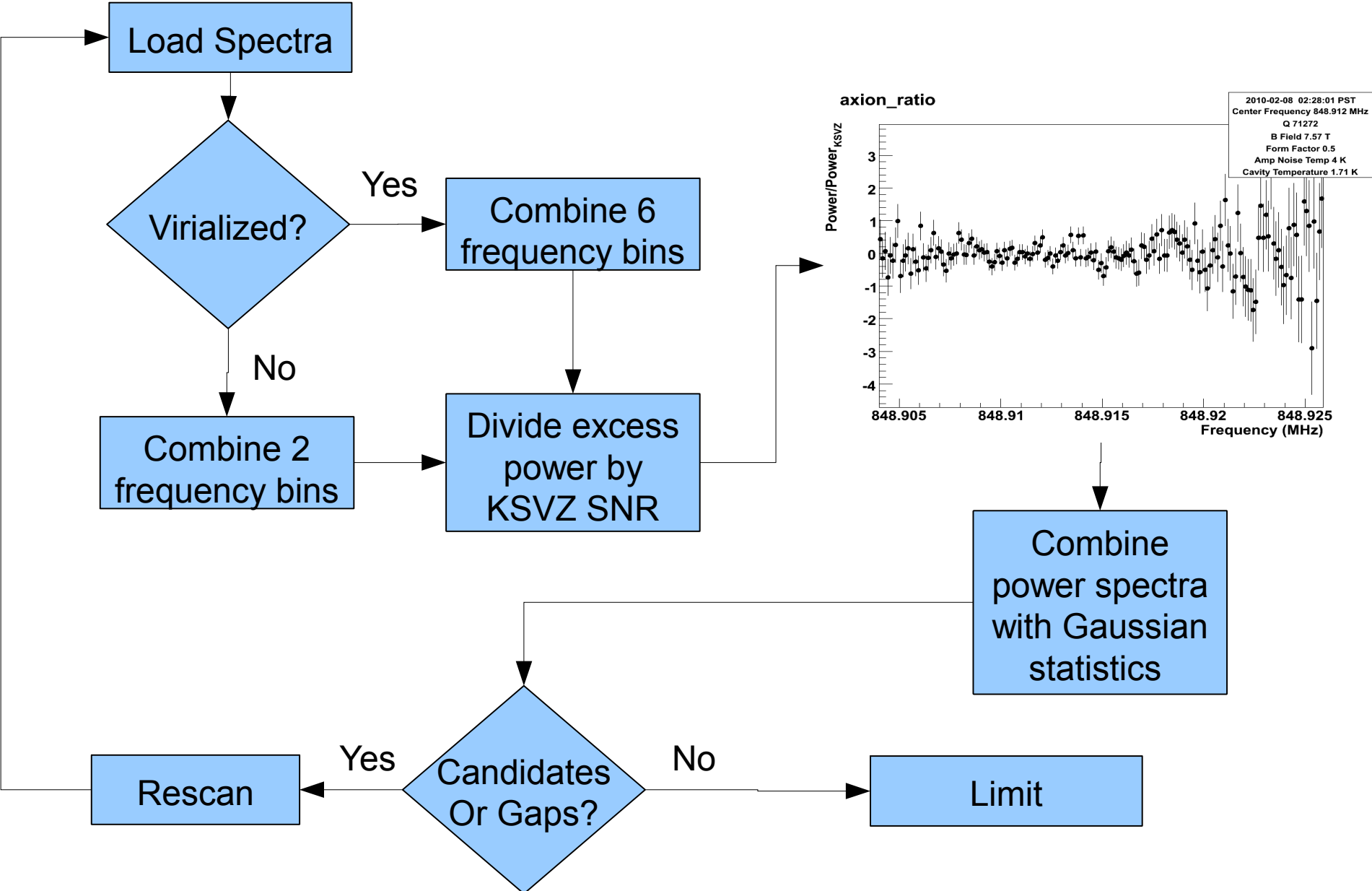


State Data

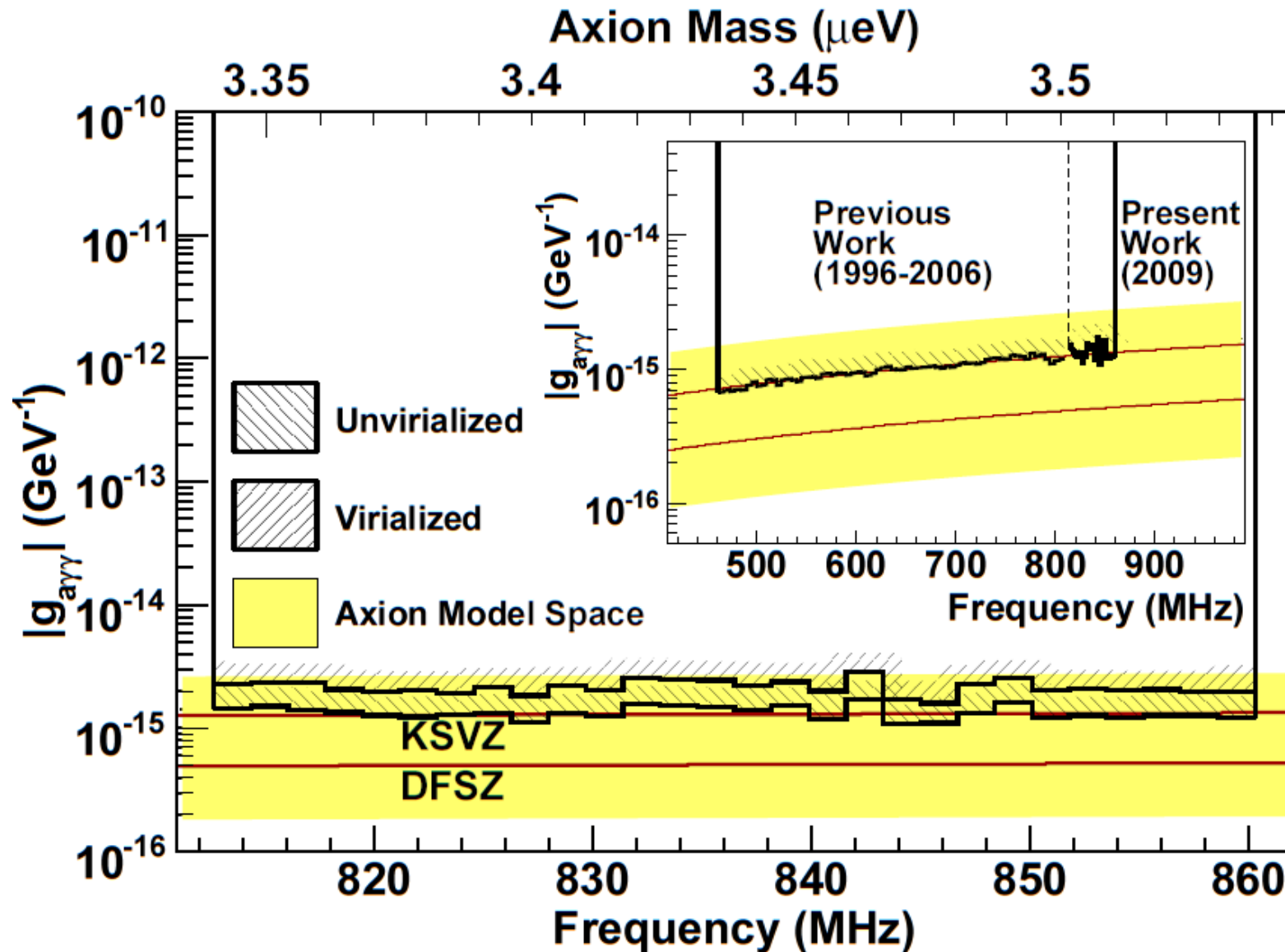
Compute axion signal spectrum



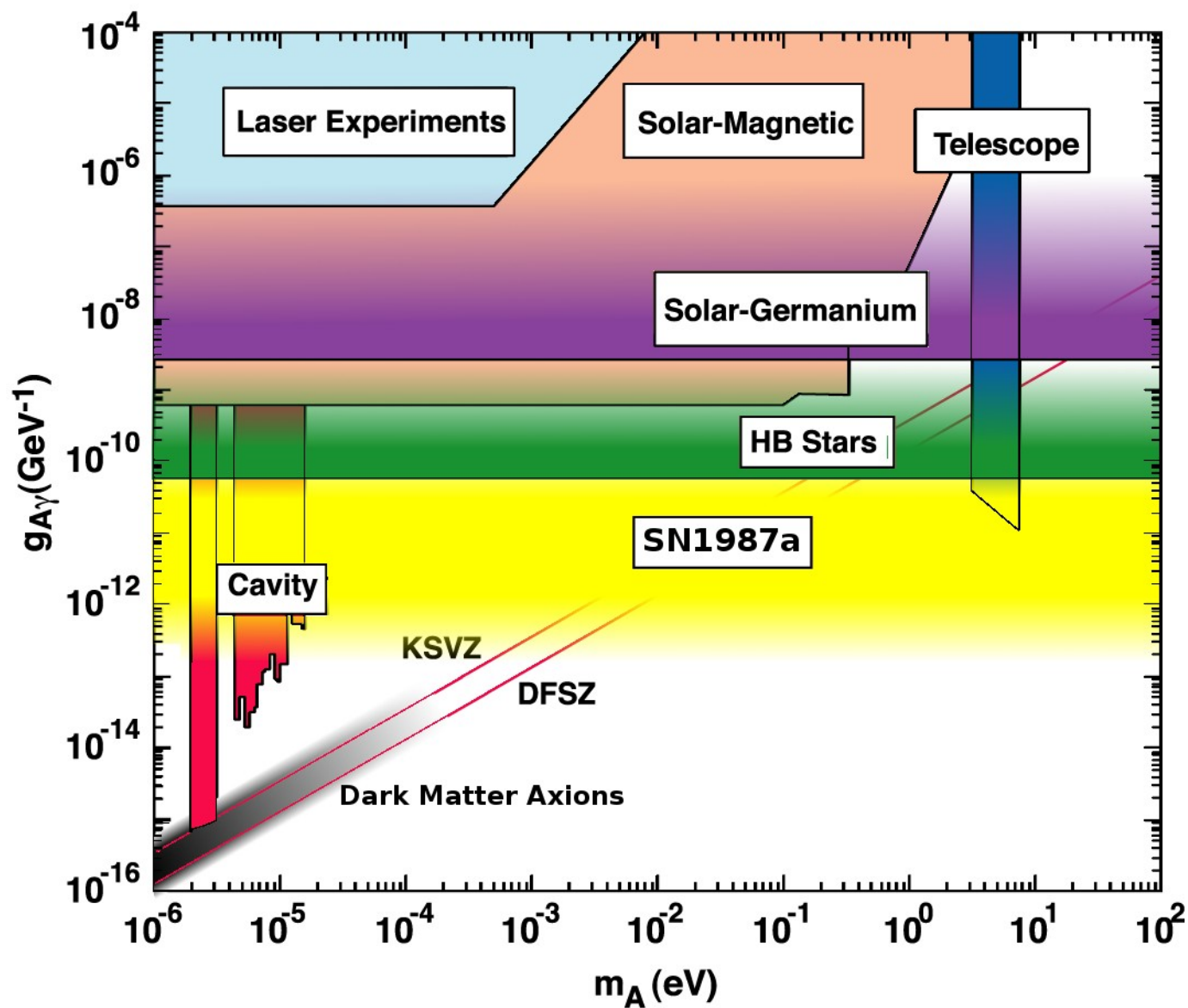
# Generating the Limit Plot



# Phys. Rev. Lett. 104, 041301 (2010)



# ADMX Limits in the Big Picture



Questions?