# Joint Dark Energy Mission (JDEM)

~~SuperNova Acceleration Probe~~

~~JDEM-SCG~~

~~JDEM-IDECS~~

~~JDEM-Omega~~

JDEM-ISWG

# Joint Dark Energy Mission (JDEM)

- Goal - Measure history of expansion rate of universe in order to probe nature of Dark Energy

    - Baryon Acoustic Oscillations; Supernovae; Weak Lensing

- Jointly funded and developed between NASA and DOE/OHEP

- History

    - Originally three competing concepts: SNAP - (Fermilab part of this collaboration); ADEPT; DESTINY

    - Merged in 2008

- History (cont.)
  - Design concept developed in 2009 by NASA/Goddard and Science Coordination Group (SCG) (exceeded cost cap of $650 million)
  - Two variant design concepts submitted to Astro2010 (exceeds cost cap)
  - New design concept(s) being developed by Interim Science Working Group (ISWG) that meet cost cap (*cough*)
    - Findings will be presented in early May 2010
  - Next steps
    - Independent cost estimate (ICE)
    - Astro2010 report

# JDEM-ISWG

- Participants:
  - ISWG (Interim Science Working Group)
  - NASA JDEM project office (Steve Kent part of this)
  - DOE JDEM project office

- To meet $650 million cost cap (excluding launch), will use only 2 of 3 possible techniques

- Mission is designed to augment, not overlap, with existing or planned (and feasible) ground experiments

- Minimum science goal: DETF F.O.M. >= 500 (Stage IV)

# Science Minima

- BAO
  - Z=1.3 to 2.0 (H-alpha)
  - 10,000 sq. deg. (?)

- Supernovae
  - Z=0.1 to 1.3
  - Spectra 0.4 to 2.0 microns

- Weak Lensing
  - 10,000 sq. deg.
  - 30 gal/sq. arcmin

# Fermilab Role in JDEM

- ~~Flash Memory Testing~~

- ~~Radiation Shield~~

- ~~Warm Electronics~~

- ~~CCD Packaging~~

- ~~Simulations~~

- Science Operations Center R&D

- Ring Of Fire Prototype (ROF)

# JDEM Science Operations Center (SOC) (concept under development)
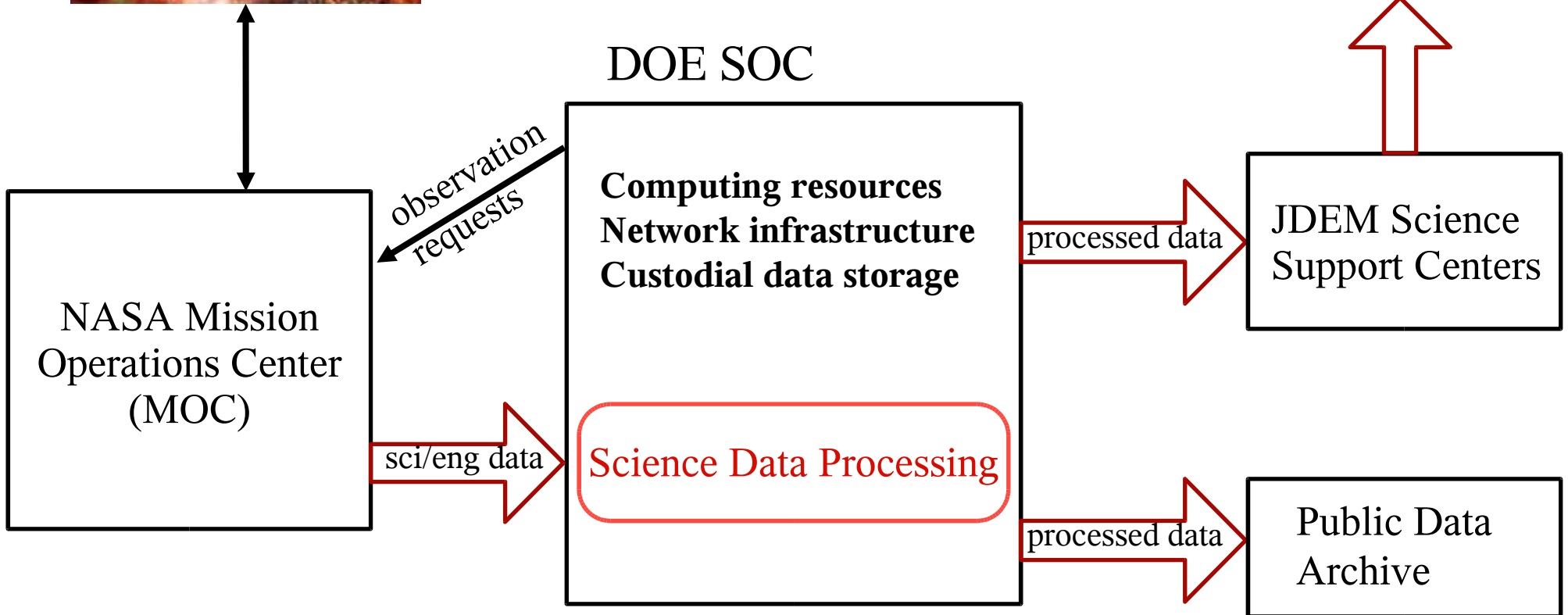
# Fermilab Tasks for FY10/FY11

- Develop slitless spectroscopy simulations and data processing needed for BAO science

- Develop prototype workflow for slitless spectroscopy

- Develop workflow for processing data from LBNL hardware demonstrator

- Develop capabilities for requirements management and requirements traceability using NASA practices

- R&D for science data processing
  - Workflow management and data provenance
  - Message passing for quality control
  - Database R&D

# Ring Of Fire (Kent & Scarpine)
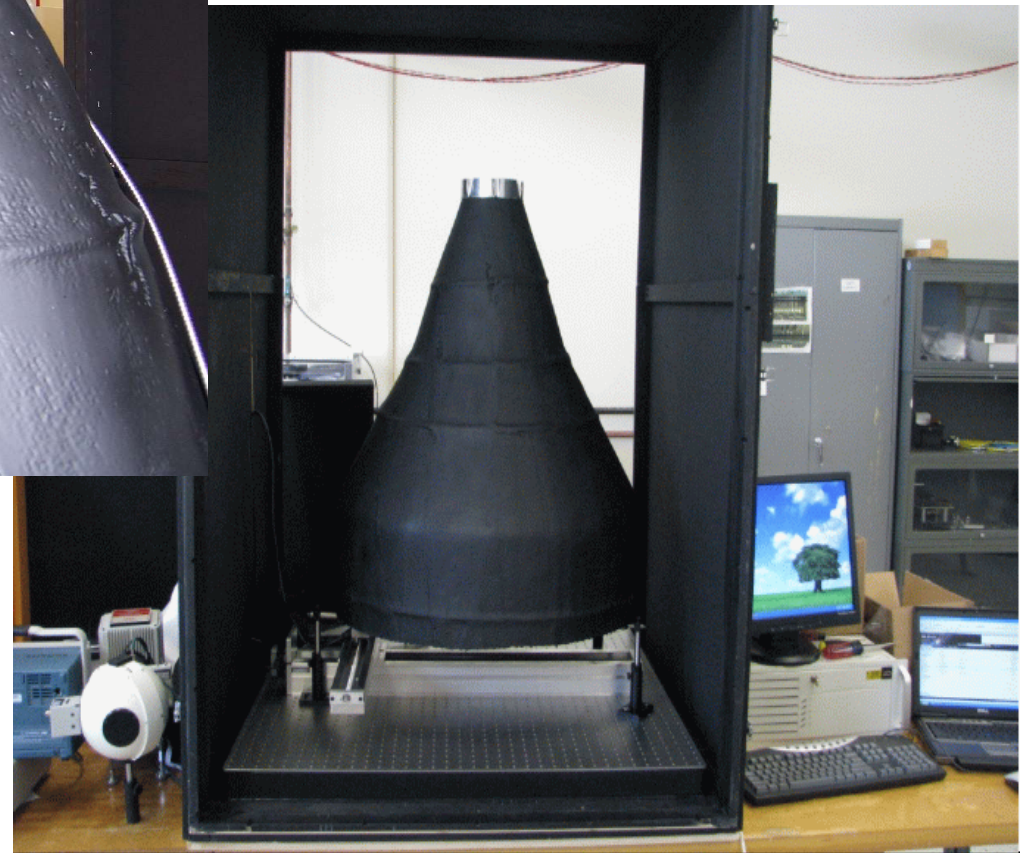
# Future

- DOE contribution up to $200 million
    - Explicitly talks about a DOE "Science Operations Center"
    - Level of support ~ few tens of millions
- Fermilab strengths
    - Experience with data processing (SDSS; DES; CMS Ops Center)
    - Experience supporting broad scientific community
- Weakness
    - No experience with a space mission
- Schedule - TBD