DOE and NASA Joint Projects

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DOE and NASA Joint Projects

Fermi Gamma-ray Space Telescope (FGST) **Status: operating**

AMS (not in NASA-Astrophysics Division) **Status: Launch late 2010**

- **DOE funds the spokesman and his group**
- **Agency program managers talk regularly**

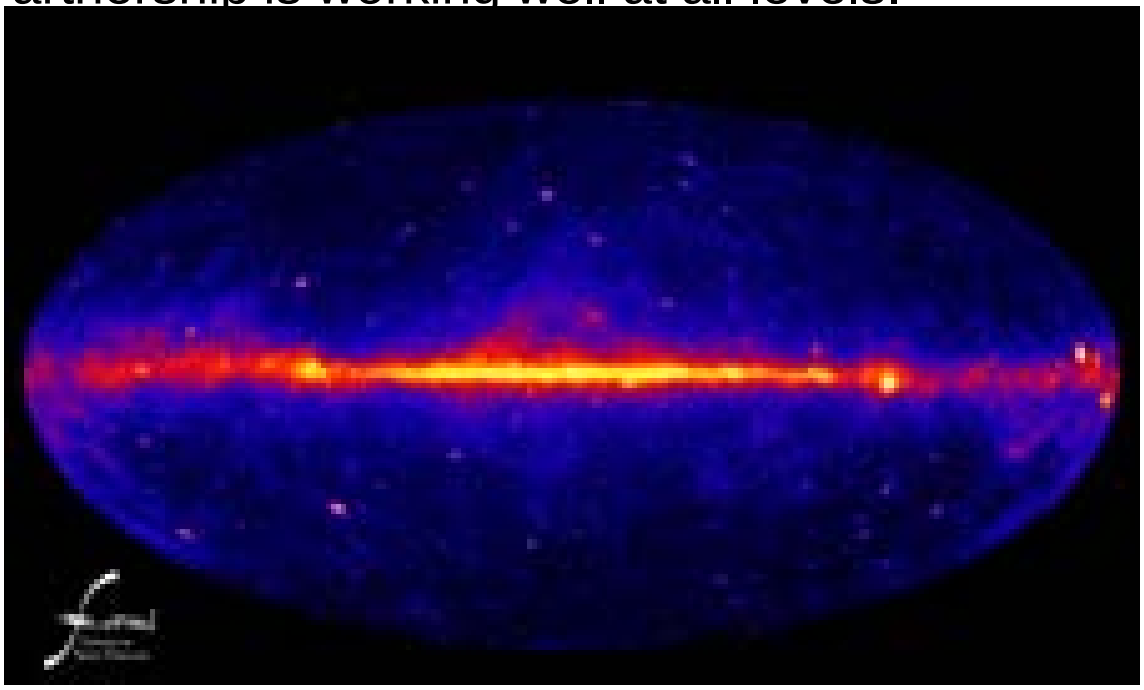
Planck **Status: launched May '09, operating in Lissajous orbit at L2**
ESA SSAC approval for 12-m extension to end 2011
DOE is providing computing resources at NERSC lbl
NASA provided instrumentation and supports IPAC Data Center

Joint Dark Energy Mission – Future Possibility

Fermi Gamma-ray Space Telescope (FGST)

NASA leads the mission operations

- DOE hosts the LAT Instrument Science Operations Center
- First year of data released in Aug. 2009 (launched June 08)
  1500 sources 100 MeV – 100 GeV, 700 AGN
- Fermi Symposium in October 2009 in DC – widely attended
- Many exciting results have been released. BL Lacs, pulsars
- Partnership is working well at all levels.



First year all-sky survey

Joint Dark Energy Mission (JDEM)

JDEM is a joint NASA-DOE mission. The mission framework was laid out in DOE and NASA MOU signed in October 2008 following design studies funded by both DOE and NASA.

JDEM Project Offices have been established at GSFC and LBNL

A DOE and NASA Interagency Management Group (IMG) to provide agency-level oversight has been established.
→ Chaired by J. Morse and D. Kovar
→ Having weekly phone calls and regular status reports from the Project Offices

The agencies are awaiting recommendations for a US dark energy science program and JDEM from Astro2010.

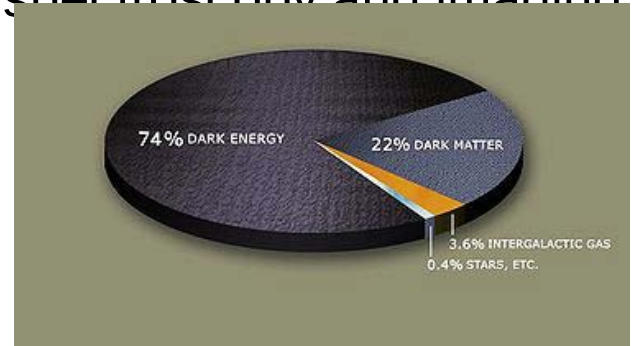
JDEM Science

- JDEM is an optical-IR survey mission with Dark Energy as its major goal. Ancillary science comes as a by-product of DE surveys.

- JDEM must perform as a precision cosmology experiment with tight error control. DE measurements are systematics limited.

- There are 3 DE major techniques. Each is best done in the stable, clear environment of space. JDEM will employ one or more of them to give 10x advance in DE.
  - weak lensing: large-scale imaging and photo-z survey 30/sq arcmin

  Psf smaller than galaxies, pixels no larger than psf
  - baryon acoustic oscillations: large-scale spectroscopy and imaging survey , in IR (1.7 or 2.0 micron)
  - supernovae: monitoring 10 deg^2 field



JDEM Status

- Two mission architectures were presented to Astro2010 in June 2009
  - JDEM-IDECS
    - HgCdTe and CCD imagers, plus HgCdTe spectrometers.
    - WL shape measurement with CCDs in visible. 0.1 asec
  - JDEM-Omega
    - HgCdTe imager and spectrometers. No CCD imager.
    - WL shape measurement with HgCdTe in space-unique NIR, at some risk. Visible photo-z data from ground.

  - The costs of both of these missions are large, putting both of these in a “facility-class” (i.e.; designed for a broader science goal and community than just dark energy).
  - The costs of both of these missions are not obviously compatible with current budget projections (for both NASA and DOE) without significant revision of priorities (for both agencies).

JDEM Status

In September 2009, NASA and DOE agreed to examine a “probe class” cost-capped mission concept.

Important to understand what can be done with “available” resources

Tasked the Project Office’s to develop a concept(s) - with input from an Interim Science Working Group

– The probe-class concept will go out for independent costing in summer 2010.

– Project offices are currently studying Probe-class architectures with cost goal of $650M + launch services

- Wide range of payload concepts under study. Varying levels of emphasis in BAO, SNe and WL techniques

- 1 - 2 of the concepts will be selected for further study

- Telescope study contracts awarded to ITT and Ball Aerospace.

- Determine feasible designs, perform integrated modeling and parametric cost trades, develop cost and schedule estimate

Informed Astro2010 that this exercise would be undertaken

JDEM Interim Science Working Group (ISWG)

The JDEM ISWG was constituted by NASA and DOE in Dec. 2009 to:

- **provide scientific assistance during JDEM pre-phase A activities**
- **to inform the Agencies on their findings (i.e. report to Agencies).**

Monthly meetings started Dec. 2009

Members were chosen from proposals submitted to NASA and DOE.

Current task is a study of Probe-class concept(s)

- **"options" so that we can readily respond to Astro2010**
- **"concepts" that can be developed (this is a pre-phase A activity)**

We may (probably) will request future studies.

- **It is assumed that the ISWG will continue until a competitive process for selecting the JDEM science team has been started.**
- **The ISWG will be disbanded at an appropriate time in advance of any competitive process for selecting scientific participation on a possible mission.**

JDEM Probe-concept study

The development of Probe-class concept(s) will allow the agencies:

- **to bound a range of options in order to respond to Astro2010**
- **to fit within our envisioned budget envelope.**

The $650M in FY09$ (not including launch vehicle) is for full Life Cycle Costs (LCC).

- **what can be done for $650M**
- **not which agency/ Institutions will build what.**
- **not what in-kind contributions above this mission size will enable**

JDEM - Summary

- New technology large-format detectors are now space qualified, enabling wide-field space surveys
- Probe concept study is underway – Project Offices and ISWG
- Space observations provide the needed clean systematics control. JDEM promises the best path forward for dark energy understanding in the coming decade.
- Awaiting recommendations for dark energy science and JDEM from Astro2010.

ESA dark energy mission, Euclid, was recently recommended by ESA's Space Science Advisory Committee to be considered by the Science Programme Committee for Phase A study (SPC meets mid-Feb).

NASA/DOE and ESA are working independently on JDEM and Euclid.