The Dark Energy Survey

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DARK ENERGY SURVEY

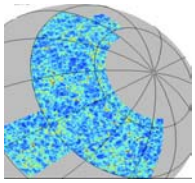
DES Collaboration

Fermilab, U of Illinois at Urbana-Champaign, U of Chicago, LBNL, U of Michigan, U of Pennsylvania, The Ohio State University, Argonne National Laboratory, NOAO/CTIO, CSIC/Institut d'Estudis Espacials de Catalunya (Barcelona), Institut de Fisica D'Altes Energies (Barcelona), CIEMAT (Madrid), University College London, U of Cambridge, U of Edinburgh, U of Portsmouth, U of Sussex, Observatorio Nacional, Centro Brasileiro de Pesquisas Fisicas, Universidade Federal do Rio de Janeiro, Universidade Federal do Rio Grande do Sul.

DES Funding

DOE, NSF, STFC (UK), Ministry of Education and Science (Spain), FINEP (Brazil), and the Collaborating Institutions

The Survey



- 525 nights using a new 3 deg^2 camera (DECam) on the Blanco 4m Telescope
- 5000 sq-deg in g,r,i,z and Y band filters
- 9 sq-deg repeating SN search
- Observations planned 2011-2016 Oct-Feb.
- Survey Area will overlap with SPT, the VHS VISTA survey and SDSS stripe 82

DES Combines Four Probes of Dark Energy

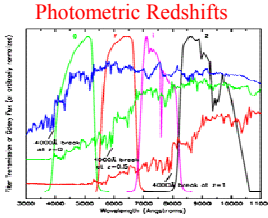
1) Weak Gravitational Lensing
Apparent shapes of ~300M source galaxies

2) Galaxy Cluster Counts
~170K galaxy clusters to z ~1.5 (~20K clusters with SZE flux measurement from SPT)

3) Type 1a Supernovae
1000-1400 SN 1a with z<1

4) Baryon Acoustic Oscillations
~ 300 million galaxies to z ~ 1

Photometric Redshifts

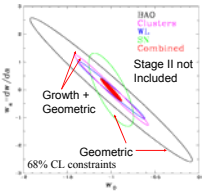


g,r,i,z and Y band filters from DES will track the 4000 Å break

J, H and K data from VHS will further constrain the photo z's

dz~0.02 for galaxy clusters with redshift z up to ~1.3

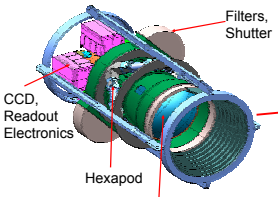
DES Forecasts



DES will produce a factor of ~4.6 improvement in the DETF Figure of Merit over the Stage II projects

Picture taken using a DECam CCD, prototype electronics and the CTIO 1m (next to the Blanco)

Dark Energy Survey Instrument: DECam

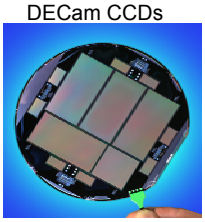


Len Fabrication is in progress!

Polishing contract awarded April 2008

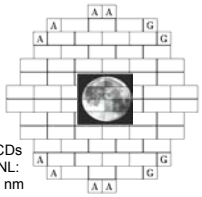
Blanks Completed in Jan. 2008

DECam CCDs



- 62 2kx4k Image CCDs: 520 Mpix
- 4 2kx2k Guide CCDs
- 8 2kx2k Alignment/focus
- Red Sensitive CCDs developed by LBNL: QE> 50% at 1000 nm

DECam Focal Plane



DES Data Management

The DES collaboration will deliver a data management system to process the ~300 GBytes/night of DECam images. The data will reside in an archive at NCSA and be available to the Collaboration and the public.

NOAO Community Use

Outside the DES observing periods, DECam will be available to NOAO community observers in the same classical mode as Mosaic II.