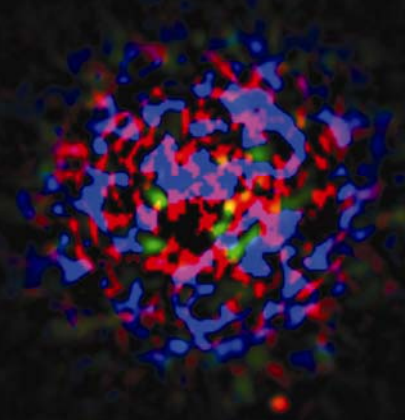
Science Steering Committee
Instrument Development Report

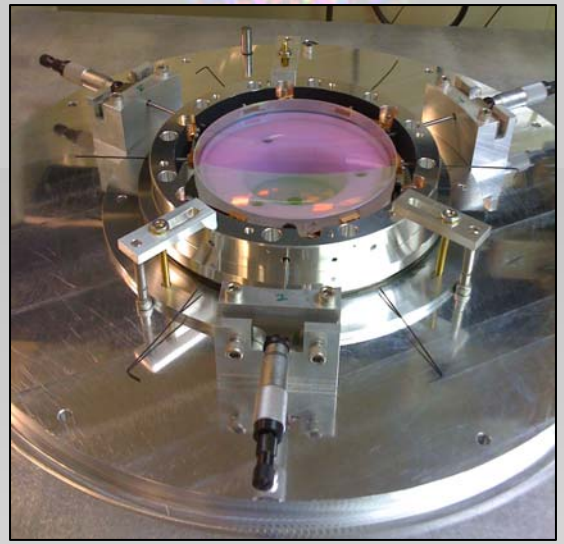
February 18, 2009
Waimea



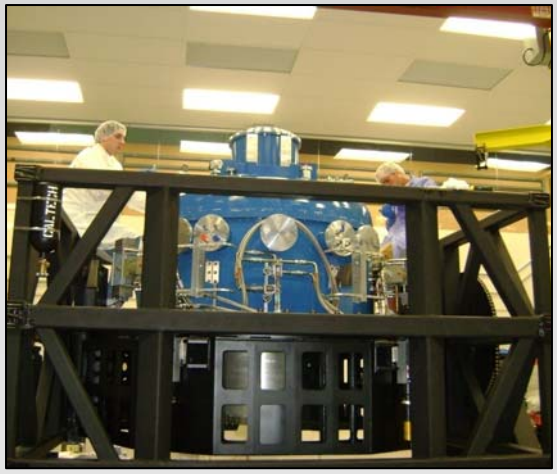
Sean Adkins

MOSFIRE

- Final science lens delivered
- First lens (collimator #2) mounted
- First cool down completed 1/1/09
  - Reached operating temperature in the expected time (~ 6 days)
  - Temperature stabilization (<1 K) demonstrated
  - Minor issues with CCR mounts and hoses to be corrected
- Second cool down with dewar window and heater, and FCS in progress
- Mechanism installation in March
  - Grating turret and pupil mechanism cold tests in progress
- Third cool down in mid-April

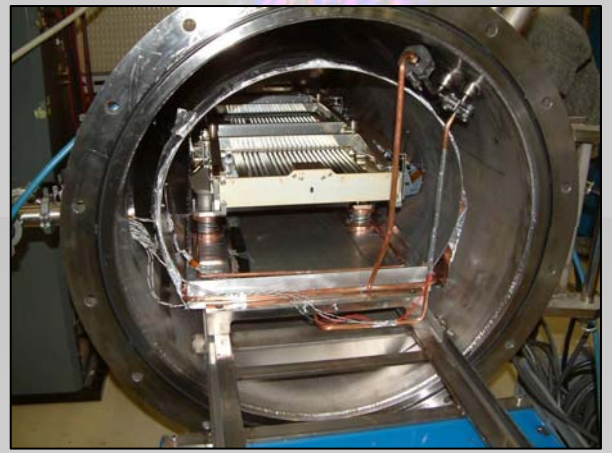


Collimator #2 in cell after bonding



Dewar prep. for cool down 1

MOSFIRE



CSU in test dewar at CERN

- CSU cold testing completed
  - Overall a success
  - Some electronics issues encountered
    - Additional warm testing in progress
    - Unit has recently passed 22 cycles of init, configure, init
    - Problems isolated to a few specific masking bars
  - Masking bar interference at edge of field when cold
    - Minor, no damaging collisions
    - In an area not used for science
    - May not be critical but want to understand cause
- MOSFIRE CSU server successfully used to operate CSU
  - CSU in Switzerland with server computer
  - Testing using VNC by John and Jason from California

MOSFIRE Risk Status

#	Description	Category	Status	Probability	Impact	Mitigation
1	CSU	Performance	Active	Likely	Major	**Warm and cold testing completed**
		Cost	Active	Likely	Moderate	Contingency allowed in budget, costs at CSEM actively monitored
		Schedule	Active	Likely	Minor	Schedule planned to keep CSU off critical path
2	Large cryogenic science optics	Performance	Active	Possible	Major	**All optics coated and delivered** Fixed price contract for optical fabrication
		Cost	Closed	Possible	Major	Optics insured for handling and shipping until installation
		Schedule	Closed	Likely	Minor	Currently optics have 2 months of slack before entering critical path
3	Science detector and ASIC	Performance	Closed	Possible	Major	Order placed with option to select from three candidate science detectors
		Cost	Closed	Possible	Moderate	Fixed price contract
		Schedule	Closed	Likely	Moderate	Order placed in DD phase to allow plenty of time for delivery, engineering detector delivered last year
4	Overall schedule and budget	Cost	Active	Likely	Major	Budget includes contingency, budget reviewed monthly, inflation allowed for, current budget includes actual costs for years 1 to 3 and allowance for cost overruns understood at DDR. Additional pressure on contingency due to unexpected cost overrun.
		Schedule	Active	Likely	Moderate	Budget allows for contingency spending on labor, schedule reviewed monthly
5	Dewar	Performance	Active	Possible	Moderate	**Thermal performance good on first cool down** **Second cool down in progress**
		Cost	Closed	Possible	Moderate	**Dewar complete and tested**
		Schedule	Active	Likely	Moderate	Budget allows for contingency spending on labor, schedule reviewed monthly
6	Cryogenic mechanisms other than CSU	Performance	Active	Likely	Moderate	Warm and cold testing of each mechanism, extensive test procedures FCS testing complete and installed in Dewar Pupil mechanism cold testing nearly complete and satisfactory Grating mechanism cold tests in progress
		Cost	Active	Possible	Moderate	Budget includes contingency, vendors have supported rework and absorbed costs due to their errors
		Schedule	Active	Likely	Moderate	Budget allows for contingency spending on labor, schedule reviewed monthly
7	Overall instrument optical alignment	Performance	Active	Likely	Moderate	Very careful metrology at every major assembly step, schedule allows for several warm alignment, cool down, and adjustment cycles
		Cost	Active	Possible	Moderate	Budget includes contingency, vendors have supported rework and absorbed costs due to their errors
		Schedule	Active	Likely	Moderate	Budget allows for contingency spending on labor, schedule reviewed monthly

Orange items highest risk, green text indicates positive mitigations or results that reduce associated risk

MOSFIRE

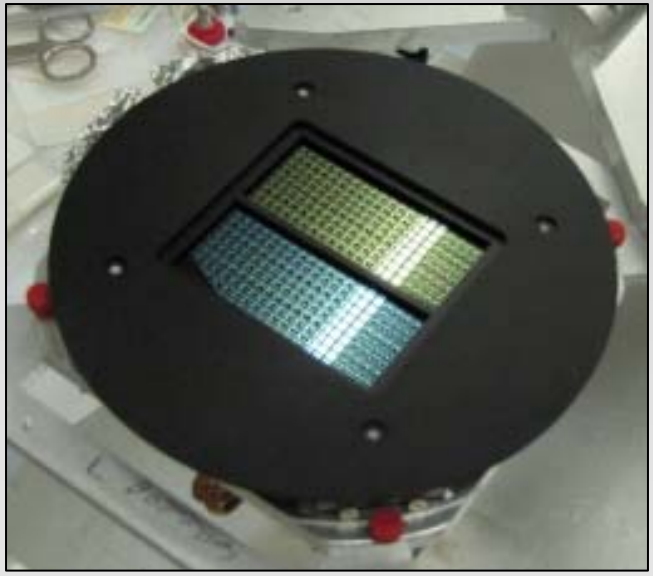
- Schedule update

Milestone	At DDR	Current
Dewar integration begins	January 2008	June 2008
First cold test	March 2008	December 2008
Mechanism integration	May 2008	January 2009
CSU integration	June 2008	March 2009
Optics Integration	September 2008	June 2009
Acceptance testing begins	May 2009	December 2009
Pre-ship review	June 2009	January 2010
Installation begins on Keck I	August 2009	March 2010
First light	September 2009	April 2010
Commissioning completed	March 2010	October 2010

- Projecting a first light slip of ~ 4 weeks
  - Started first cool down late (end December instead of beginning)
  - Grating turret tests taking longer than expected
  - Depends on completing optics assembly and next cool downs

LRIS Red Upgrade

- Dewar and electronics complete
  - in test with engineering grade detectors
  - hold time > 24 hours at 70 °F ambient
  - engineering detector testing confirms no crosstalk or other anomalies



Engineering CCDs ready to install in dewar (with reflection of ceiling lights)

Dewar with full readout electronics and focus stage under test

LRIS Red Upgrade

- Focus stage complete
  - passed first long term test (1000 discrete moves over 2 days)
  - 2 count position repeatability, equal to ~2 μm of focus error
- Complete system now in test
  - dewar, electronics, focus stage, shutter
- Remaining tasks
  - Continue software integration and test
  - Install science grade detectors at the end of February
  - Pre-ship review week of April 6
  - Installation at summit starts in May
  - First light June 6
  - Return to science operations June 14