

Clusters and Cosmology with the Great Observatories

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Workshop Goals

- *Identify questions that meet at least one of the following:*
 - Are poorly understood/most hotly debated
 - Benefit substantially from multiwavelength observations
 - Are planned for future observatories and require major preparatory work

- *Consider observational campaigns of highest scientific impact:*
 - In the last five years
 - In the next five years

- *Observational campaigns of highest scientific impact:*
 - Estimation of the Hubble constant by the Hubble Key Project (2001)?
 - HST detection/monitoring of (hosts of) high-z type Ia SNe (2004)?
 - Spitzer/Hubble + ground detection of (massive) galaxies in the “early” universe (2005)?
 - Extragalactic background light contributions from resolved sources?
 - Spitzer - 24, 70 microns resolved and stacked contributions (2006)
 - Hubble - resolved galaxy contribution
 - Chandra - 0.5-10 keV source background
 - + others
 - HST absorption line key project + STIS (1998, 2002)?
 - Detailed gas morphology in galaxy clusters?
 - Spectral imaging for determining cluster masses to large radii
 - Cooling flows
 - Lensing?
 - “flat rotation curves” in E’s via strong lensing (2006)
 - “GOODS/GEMS/COSMOS-like” mass maps (2006)
 - “believable” mass maps/determinations in (high-z) clusters (e.g., 2005, 2006)

- *Identify questions that meet at least one of the following:*
 - Are poorly understood/most hotly debated
 - Benefit substantially from multiwavelength observations
 - Are planned for future observatories and require major preparatory work
- *What are the (“standard/other” model) cosmological parameters?*
- *Where are the low-z baryons? Where are the baryons in galaxy clusters?*
- *What is the Hubble constant?*
- *What is the EBL and its sources?*
- *Do we understand systematics that would feed into a mission like e.g., JDEM?*
 - SN evolution? Precision of measurements? Environmental effects? Photo-z’s?
 - Systematics in “other” methods (e.g., lensing, BAO)
- *Do we need a new TAC process?*
 - To consider “enabling” (large) programs for future facilities
 - To enable large programs on all telescopes
 - Faster turnaround to follow exciting science (in a time-limited lifetime environment)

- *Observational campaigns of highest scientific impact:*
 - Detecting/monitoring of (hosts of) (high-z) type Ia SNe?
 - Leave (some of this) for JDEM/JWST?
 - Test (JDEM) methods/limitations/systematics
 - Study hosts with Cepheids, low-z events
 - Extragalactic background light determinations?
 - Close gap between resolved source and absolute measurements
 - Stacking analyses from sources identified ... somehow
 - (Low-z) (& cluster) baryon (and cluster Fe) census?
 - Do low-z census with COS (if it flies)
 - Bubbles in clusters / detailed cluster gas dynamics?
 - Probe AGN/SF feedback. Impact on cooling. Black hole masses.
 - Need deep CXO observations with Spitzer SF rate determinations in BCGs.
 - Determine N(M,z) of galaxy clusters (HST, CXO + ground)?
 - Calibrate cluster mass determination (via CXO/HST) around $z=0.5$
 - Cluster mass/gas profiles (via stacking, or deep, pointed observations of a few “golden” clusters)
 - Surveys for high-z galaxy clusters (Spitzer + spectroscopy)?
 - Overlap with S-Z, SPT