

## Major Programs using the Great Observatories

The following tables collect major science programs undertaken by the three Great Observatories. Most of these programs are drawn from the following proposal subsets:

*HST Large Programs*: >100 orbits or > 100 snapshot targets;

*HST Treasury Programs*: major science programs that include distributing data products to the science community;

see <http://archive.stsci.edu/hst/tall.html>

*Chandra Large Programs*: > 300 ksecs

*Chandra Very Large Programs*: > 1 Megasecs

see [http://asc.harvard.edu/target\\_lists/index.html](http://asc.harvard.edu/target_lists/index.html)

*Spitzer Legacy Programs*:

see <http://ssc.spitzer.caltech.edu/legacy/>

The individual programs have been grouped under broad subject headings, and similar programs are as far as possible, listed together.

### *Solar System & Extrasolar Planets*

Program	PI	Title	Comments
HST 8267	Gilliland	Taking the Measure of Planets in the Globular Cluster 47 Tuc	Deep ACS imaging at multiple epochs
HST 8583	Storrs	Imaging snapshots of asteroids	WFPC2
HST 8699	Lamy	The origin of short-period comets	WFPC2
CXC6	Lisse	Comet 9P/Tempel 1 during the Deep Impact encounter	ACIS-S
HST 9060, 9386, 10801	Noll	Imaging of Kuiper belt asteroids	ACS & NICMOS
HST 9433	Bernstein	The size distribution of KBOs	ACS
HST 10862	Clarke	Comprehensive Auroral Imaging of Jupiter and Saturn during the International Heliophysical Year	ACS/SBC

### *Stellar Programs*

Program	PI	Title	Comments
HST 6119	Bond	Snapshot survey for companions to Planetary-Nebula nuclei	WFPC2
CXC6	Kastner	The X-ray spectrum of a planetary nebula at high resolution	ACIS-S/LETG
HST 7420, 7894, 9485	Golimowski, Henry	A near-infrared survey for companions to nearby stars	NICMOS
HST 8532	Nelan	White dwarf and M stars in the Solar Neighbourhood – revealing	FGS

		binarity	
HST 8581	Reid	A search for low-mass companions to ultracool dwarfs	WFPC2
HST 9357	Gaensicke	Towards a global understanding of accretion physics -- Clues from an UV spectroscopic survey of cataclysmic variables	STIS
HST 8188	Keyes	Snapshot spectroscopic diagnostic survey of symbiotic stars	STIS
HST 9463, 9801	Sahai	Are OH/IR stars the youngest post-AGB stars? An ACS SNAPshot survey	ACS
HST 10263, 10549, 10867 etc	Kirshner	SAINTS: Supernova 1987A monitoring program	WFPC2, ACS
CXC5	McCray	Spatially resolved grating spectrometry of the newborn SN remnant SNR 1987A	ACIS-S/LETG
CXC2	Ayres	Tortured coronae in the rapid breaking zone	ACIS-S/HETG
CXC2	Hester	Co-ordinated Chandra/HST observations of the Crab nebula	ACIS-S
HST 6129, 6573, 7407, 8222, 8552, 10526	Hester	Continuum, emission-line and polarised images of the Crab nebula	WFPC2, ACS
HST 9420	Davidson	Intensive Coverage of the Eta Carinae Event in 2003	STIS
CXC4	Corcoran	Unveiling Eta Carinae: Chandra observations during the 2003/5 event	ACIS-S HETG
CXC5	Hwang	The Cassiopeia A explosion: getting at the core issues	ACIS-S
CXC7	Park	O-rich SNR G292.0+1.8: A textbook example of the Galactic core-collapse SNR	
CXC7	Reynolds	Kepler's supernova remnant: circumstellar interactions, particle acceleration and Type Ia supernova origins	
CXC3	Grindlay	Complete compact object and binary survey of 47 Tuc	ACIS-S
CXC3	Kulkani	A Chandra survey for compact objects in supernova remnants	ACIS-I

CXC4	Pavlov	First measurement of the gravitational redshift at the surface of a neutron star	ACIS-S
CXC5	Paerels	High resolution photospheric spectroscopy of the neutron star in EXO0748-676	ACIS-S
CXC6	Slane	The structure and composition of pulsar winds and their nebulae	ACIS-S
CXC6	van Kerkwijk	Spectra of neutron stars with strongly magnetised hydrogen atmospheres	HRC-S/HETG
CXC7	Jonker	The lowest-luminosity quiescent neutron star transient: implications for strong field gravity and the neutron star EoS	ACIS-S
CXC7	Miller	The Chandra HETGS Atoll/Z spectroscopic survey	Deep observations of 6 neutron star binaries
CXC6	Townsley	Massive star life, death and rebirth in the Perseus Arm	ACIS-I
CXC7	Townsley	Winds, OB populations and young stars; New science from M17	ACIS-I
CXC7	Micela	The initial mass function in the outer galaxy: the star forming region NGC 1893	ACIS-I
CXC3	Baganoff	Monitoring the extreme X-ray flaring of Sagittarius A* and a deep survey of the central 40 pc of the galaxy	ACIS-I
CXC7	Muno	A Legacy study of stellar life cycles at the Galactic Centre	

### *Star Formation and the ISM*

<b>Program</b>	<b>PI</b>	<b>Title</b>	<b>Comments</b>
HST 8241, 8662	Lauroesch	A SNAPSHOT Survey of Interstellar Absorption Lines	STIS
HST 10246	Robberto	The HST survey of the Orion Nebula Cluster	ACS, WFPCS2, NICMOS
Spitzer GTO		The Spitzer Orion Nebula Cluster survey	IRAC, MIPS
CXC4 + GTO	Feigelson	An ultradeep Chandra study of the Orion Nebula	ACIS-I
Spitzer01	Evans	From molecular cloud cores to	IRAC, MIPS, IRS

		planet-forming disks	
Spitzer01	Meyer	The formation and evolution of planetary systems	IRAC, MIPS, IRS
Spitzer01	Churchwell	GLIMPSE: Galactic Legacy Infrared Mid-Plane Survey Extraordinaire	IRAC survey of 240 sq. deg. in the Plane
Spitzer02	Churchwell	GLIMPSE II – imaging the central +/-10 degrees of the Galactic Plane	IRAC data for $-65 < l < 65$ , $-10 < b < 10$
Spitzer03	Benjamin	GLIMPSE 3D – The Vertical Stellar and Interstellar Structure of the Inner Galaxy	IRAC data for $-2 < l < 2$ , $-4.2 < b < 4.2$
Spitzer02	Carey	MIPSGAL: a 24 and 70 micron survey of the inner Galactic Plane	MIPS
Spitzer03	Carey	MIPSGAL II: Surveying the innermost part of the Galactic plane at 24 and 70 micron with MIPS	MIPS
Spitzer03	Allen	Gould's Belt: Star Formation in the Solar Neighborhood	IRAC, MIPS
Spitzer01	Padgett	A Spitzer Imaging Survey of the Entire Taurus Molecular Cloud	IRAC, MIPS
Spitzer03	Padgett	Taurus 2: Finishing the Spitzer Map of the Taurus Molecular Clouds	IRAC, MIPS
CXC2	Wang	Chandra survey of the Galactic ridge around the Milky Way Center	ACIS-I
CXC4	Slane	A detailed study of 3C58 – the youngest known pulsar nebula in the galaxy	ACIS-S
CXC4	Hughes	Studying high mach number shocks in young supernova remnants with Chandra	ACIS-I

### *Resolved Stellar Populations*

<b>Program</b>	<b>PI</b>	<b>Title</b>	<b>Comments</b>
HST 8676	Richer	Constraining the age of the oldest stars from the white dwarf luminosity function (M4)	ACS
CXC6	Rutledge	A search for sub-millisecond pulsars in 47 Tuc	
HST 9077	Shaw	Study of the LMC Planetary nebula	STIS imaging
Spitzer02	Meixner	SAGE: Spitzer Survey of the Large Magellanic Cloud	IRAC, MIPS
CXC4	Seward	Studying supernova remnants in the Magellanic Clouds	ACIS-S

HST 9453, 10265, 10816	Brown	The age and formation history of the Andromeda Galaxy halo	ACS
HST 10505	Gallart	The Onset of Star Formation in the Universe: Constraints from Nearby Isolated Dwarf Galaxies	ACS
HST 10889	de Jong	The Nature of the Halos and Thick Disks of Spiral Galaxies	ACS
HST 10915	Dalcanton	An ACS nearby galaxy survey	ACS: 72 galaxies, d < 2.5 Mpc + M81 group

### *Unresolved Stellar Populations*

<b>Program</b>	<b>PI</b>	<b>Title</b>	<b>Comments</b>
HST 6346	Borne	A snapshot survey of the ultraluminous IRAS galaxy sample	WFPC2
Spitzer01	Kennicutt	SINGS: the Spitzer Infrared Nearby Galaxies Survey – Physics of the star-forming ISM and galaxy evolution	75 galaxies to 30 Mpc; IRAC+MIPS
HST 8601	Seitzer	A snapshot survey of probably nearby galaxies	WFPC2
HST 9788	Ho	A Narrow-band Snapshot Survey of Nearby Galaxies	ACS
HST 6359	Stiavelli	Core properties of the bulges of spiral galaxies	WFPC2
HST 7331	Stiavelli	Near-IR properties of the bulges of spiral galaxies	NICMOS
HST 8599	Boeker	A census of nuclear star clusters in nearby late-type spiral galaxies	WFPC2
HST 8632	Giavalisco	A UV Atlas of Nearby Galaxies	WFPC2
HST 9042	Smartt	An archive to detect the progenitors of massive, core-collapse supernovae	WFPC2
CXC2	Prestwich	The X-ray point source population in normal galaxies	ACIS-S
CXC3	Fabbiano	An in-depth study of the X-ray source population and hot ISM of the Antennae galaxies	ACIS-S
HST 10452	Beckwith	HST/ACS Mosaic of M51	ACS
CXC5	Kuntz	An ultra-deep study of M101	ACIS-S
CXC7	Sasaki	The Chandra ACIS survey of M33: A deep survey of the nearest face-on spiral galaxy	ACIS-I

HST 6357	Jaffe	The nuclear morphology of elliptical galaxies	WFPC2
CXC7	Fabbiano	A Chandra legacy program: deep study of LMXB populations (in ellipticals)	ACIS-I
HST 10776	Mountain	HST/ACS Mosaic of M82	ACS

### *Galaxy clusters*

<b>Program</b>	<b>PI</b>	<b>Title</b>	<b>Comments</b>
HST 9401	Cote	An ACS Virgo Cluster survey	ACS
HST 10861	Carter	An ACS Treasury survey of the Coma cluster of galaxies	ACS
HST 8683	van der Marel	Imaging of brightest cluster galaxies: the high end of the black hole mass distribution	WFPC2
CXC4	Schapf	Surveying the Fornax cluster of galaxies	ACIS-I
CXC5	Fabian	A megasecond image of the core of the perseus cluster	ACIS-S
CXC3	Ebeling	MACS: The X-ray properties of the most massive galaxy clusters at $z > 0.3$	ACIS-I
CXC4	Hughes	Chandra observations of DLS Shear-selected clusters	ACIS-I
CXC5	Markevitch	The most interesting cluster in the universe (1E0657-56)	ACIS-S
CXC6	Vikhilin	A Chandra treasury: observations of the best example of a cluster cold front (Abell 3667)	ACIS-I
CXC2	Stanford	A complete X-ray cluster sample at $z > 0.8$	
CXC7	Buote	The cosmological formation of galaxy groups	

### *AGNs & QSOs*

<b>Program</b>	<b>PI</b>	<b>Title</b>	<b>Comments</b>
HST 5957, 6348, 6967, 10173, 10606, 10882	Sparks	Multi-wavelength snapshot survey of 3CR radio galaxies	WFPC2, NICMOS, ACS
HST 6361	Boyle	High-resolution imaging of X-ray	WFPC2

		selected AGN	
HST 7330	Mulchaey	The fueling of active nuclei: A NICMOS snapshot survey of Seyferts	NICMOS
HST 7919	Sparks	NICMOS3 campaign snapshots of nearby galactic nuclei	NICMOS
HST 9379	Schmitt	Near Ultraviolet Imaging of Seyfert Galaxies: Understanding the Starburst-AGN Connection	ACS
HST 9454	Maoz	The Nature of the UV Continuum in LINERs: a variability test	ACS/HRC
CXC6	Forman	The history of AGN activity in M87 and the interaction of nuclear outbursts with the surrounding atmosphere	ACIS-I
CXC5	Wilkes	The balance of power between starbursts and AGN: a Chandra/SIRTf survey	ACIS-I overlaps Spitzer SWIRE survey
HST 6363	Urry	The Environments and Host Galaxies of BL Lac objects	WFPC2
HST 9382	Rao	A Large Targeted Survey for $z < 1.6$ Damped Lyman Alpha Lines in SDSS QSO MgII-FeII Systems	STIS
HST 9506	Stoche	A snapshot survey of high column density, low- $z$ Ly-alpha absorbers	STIS
HST 10556	Turnshek	Neutral gas at $z=0.5$	
CXC2	Mathur	Finding the baryons in the low redshift universe	ACIS-S LETG
CXC2	George	Determining the nature of the variable absorption in NGC 3783 with Chandra/HST	ACIS-S
HST 8606	Crenshaw	HST NGC 3783 program	STIS
CXC3	Kaastra	Resolving the warm absorber in NGC 5548	HRC-S/LETG, ACIS-S/HETG
CXC4	Kaastra	Connecting the X-ray and UV ionised absorbers in Mrk 279	ACIS-I
CXC5	Lee	A Chandra HETGS & HST view of the warm and lukewarm absorbers in IRAS 13349+2438	ACIS-S
CXC5, CXC6	Nicastro	X-raying the intergalactic medium with blazars in outburst	HRC-S/LETG

## Cosmology

Program	PI	Title	Comments
HST 1022, 2424 etc	Bahcall	QSO absorption lines: Key project	FOS
HST5972, 6431, et al	Aaronson, Mould, Freedman	Determination of the extragalactic distance scale: Key project	WFPC2
HST 9771	Karachentsev	The local Hubble flow and the density field within 6 Mpc	ACS
HST 10429	Blakeslee	Streaming Towards Shapley: The Mass of the Richest Galaxy Concentration in the Local Universe	ACS
HST 10842	Cook	A Cepheid distance to the Coma cluster	ACS
HST 10802	Riess	SHOES-Supernovae, HO, for the Equation of State of dark energy	NICMOS, ACS
HST 8641, 9118	Schmitt	Testing the Accelerating Universe	ACS
HST 9352	Riess	The Deceleration Test from Treasury Type Ia Supernovae at Redshifts 1.2 to 1.6	ACS
HST 10182	Filippenko	Towards a Comprehensive Understanding of Type Ia Supernovae	ACS/HRC
HST 10496	Perlmutter	Decelerating and Dustfree: Efficient Dark Energy Studies with Supernovae and clusters	ACS
<b>CXC6</b>	<b>Vikhilin</b>	<b>Dark energy with X-ray clusters: Chandra observations of 41 high-redshift clusters from the 200 sq. deg. ROSAT PSPC survey</b>	<b>ACIS-I</b>
HST 9184	Tripp	A Survey for Missing Baryons in Highly Ionized intergalactic medium	STIS
HST 8202	Gregg	Bright Quasar Close Lensing search	STIS
HST 9472	Strauss	A Snapshot Survey for Gravitational Lenses among $z > 4.0$	ACS
HST 9744	Kochanek	HST imaging of gravitational lenses	ACS, NICMOS
HST 9405	Fruchter	The Origin of Gamma-Ray Bursts	ACS, NICMOS
HST 10551	Kulkarni	Gamma-Ray Bursts from Start to Finish: A Legacy Approach	ACS



*Galaxy Formation – deep surveys*

<b>Program</b>	<b>PI</b>	<b>Title</b>	<b>Comments</b>
HST 2684, 3917, 4018, 4029, 4082 etc	Griffiths	Medium deep survey: Key Project	WFPC2, parallel observations
HST 5090	Groth	Groth strip	WFPC2, GTO
HST 6357	Williams	The Hubble Deep Field	WFPC2
CXC2, CXC3	Brandt	The Chandra deep survey of the HDF-North	ACIS-I
HST 7235	Thompson	Observations of the Hubble Deep Field with NICMOS	NICMOS
HST 8058, 8071, 8073, 8074, 8075, 8076	Williams	The Hubble Deep Field South	WFPC2, NICMOS
CXC2, CXC5	Giacconi, Brandt	An ultra-deep survey in the Chandra deep field south	ACIS-I
Spitzer02	van Dokkum	A public deep IRAC survey in the extended Chandra deep field south	IRAC
HST 9500	Rix	The Evolution of Galaxy Structure from 10, 000 Galaxies with $0.1 < z < 1.2$ in the CDF-S	ACS
HST 9425, 9583	Giavalisco	The Great Observatories Origins Deep Survey	ACS
Spitzer01	Dickinson	GOODS: 300 sq. arcmin in the HDF-N and CDF-S	IRAC, MIPS
Spitzer03	Dickinson	A Deep-Wide Far-Infrared Survey of Cosmological Star Formation and AGN Activity	MIPS
HST 10530	Malhotra	Probing evolution and reionisation spectroscopically: PEARS	ACS/GRISM
HST 9978, 9803, 10632	Beckwith, Thompson, Stiavelli	The Ultra-deep field	ACS, NICMOS
HST 9822, 10092	Scoville	The COSMOS 2-Degree ACS Survey	ACS
Spitzer02	Sanders	SCOSMOS: The Spitzer deep survey of the HST COSMOS 2-degree ACS field	IRAC, MIPS
Spitzer03	Sanders	SCOSMOS: The MIPS deep survey of the COSMOS 2-degree field	MIPS

Spitzer01	Lonsdale	Spitzer Wide-area Infrared Extragalactic survey (55 sq. deg.)	IRAC, MIPS
Spitzer03	Schiminovich	SSGSS: The Spitzer SDSS GALEX Spectroscopic Survey	IRS
Spitzer03	Armus	A Spitzer Spectroscopic Survey of a Complete Sample of Luminous Infrared Galaxies in the Local Universe	IRS
Spitzer03	Yan	Mid-IR Ultra-Deep Spectroscopy of the Cosmic Infrared Background	IRS
CXC4	Jones	A Chandra wide-field survey to map the cosmic web and investigate the evolution of nuclear accretion	ACIS-I
CXC6	Nandra	Deep Chandra imaging of the extended Groth strip: The co-evolution of black holes and galaxies	ACIS-I
CXC7	Zappacosta	Searching for WHIM in Large-Scale structure	ACIS-I