

Cycle 16 Abstract catalog (based on Phase I submissions)
Generated on: Wed Jan 14 17:00:44 EST 2009

Proposal Category: G0
Scientific Category: SOLAR SYSTEM
ID: 11970
Title: HST Observations of Titan's Escaping Atmosphere in Transit
and in Emission
PI: John Clarke
PI Institution: Boston University

We propose UV observations using the ACS/SBC of Titan's extended escaping atmosphere for the Jan/Feb 2009 period of transits of Titan across Saturn. A combination of absorption of Saturn's reflected solar UV emission in transit, and extended emissions primarily from H atoms away from transit, will yield new information about the structure of Titan's extended upper atmosphere. These observations are expected to provide new constraints on theoretical models for a hydrodynamic flow of species through Titan's exobase level, resulting from the interpretation of recent Cassini measurements at Titan.

Proposal Category: G0
Scientific Category: SOLAR SYSTEM
ID: 11972
Title: Investigating the Early Solar System with Distant Comet
Nuclei
PI: Karen Meech
PI Institution: University of Hawaii

We propose 85 orbits of imaging observations with the WFPC2 to get nucleus size estimates for 8 well observed dynamically new and long-period comets at large distances from the sun when their activity levels are low. This will increase the sample of these nucleus sizes by nearly 50%, but will more than double the selection of comets for which we can run thermal models. Small icy bodies are the best preserved remnants of planet formation, and we have recently found that observationally constrained thermal models can distinguish differences in microphysical properties of comet nuclei. The new HST data will enable the first exploration of physical conditions in different regions of the early solar nebula.

Proposal Category: G0
Scientific Category: COSMOLOGY
ID: 11974
Title: High-resolution imaging for 9 very bright,
spectroscopically confirmed, group-scale lenses
PI: Sahar Allam
PI Institution: Fermi National Accelerator Laboratory (FNAL)

There are large samples of strong lenses that probe small (galaxy) scale masses (e.g., SLACS, SQLS, COSMOS). There are also large samples of strong lenses that probe large (rich cluster) scale masses (e.g., various rich Abell clusters, the Hennawi et al. 2008 SDSS sample). The sample of strong lenses that probe intermediate (group/cluster-core) scale masses, however, is sparse, and so any significant additions to this sample are important. Here we

present a sample of strong lenses that not only probe these intermediate scales but are also quite bright, since the sample is based almost entirely upon data from the SDSS, a relatively shallow and poor-resolution survey, at least in comparison to most other strong lens hunting grounds, such as COSMOS and CFHTLS. What we lack are the high-resolution imaging data needed to construct detailed lensing models, to probe the mass and light profiles of the lensing galaxies and their environments, and to characterize the morphologies of the lensed (source) galaxies. Only HST can provide these data, and so we are proposing here for 81 orbits of deep WFPC2 F450W, F606W and F814W imaging, for 9 of our best and brightest intermediate-scale lensing systems with known spectroscopic redshifts and with Einstein radii between 4 and 8 arcsec.

Proposal Category: G0
Scientific Category: HOT STARS
ID: 11975
Title: UV light from old stellar populations: a census of UV sources in Galactic Globular Clusters
PI: Francesco Ferraro
PI Institution: Universita di Bologna

In spite of the fact that HST has been the only operative high-resolution eye in the UV-window over the last 18 years, no homogeneous UV survey of Galactic globular clusters (GGCs) has been performed to date. In order to fill this gap in the stellar population studies, we propose a program that exploits the unique capability of the WFPC2 and the SBC in the far-/mid- UV for securing deep UV imaging of 46 GGCs. The proposed observations will allow to study with unprecedented accuracy the hottest GGC stars, comprising the extreme horizontal branch (HB) stars and their progeny (the so-called AGB-manque', and Post-early AGB stars), and "exotic stellar populations" like the blue straggler stars and the interacting binaries. The targets have been selected to properly sample the GGC metallicity/structural parameter space, thus to unveil any possible correlation between the properties of the hot stellar populations and the cluster characteristics. In addition, most of the targets have extended HB "blue tails", that can be properly studied only by means of deep UV observations, especially in the far-UV filters like the F160BW, that is not foreseen on the WFC3. This data base is complemented with GALEX observations in the cluster outermost regions, thus allowing to investigate any possible trend of the UV-bright stellar types over the entire radial extension of the clusters. Although the hottest GGC stars are just a small class of "special" objects, their study has a broad relevance in the context of structure formation and chemical evolution in the early Universe, bringing precious information on the basic star formation processes and the origin of blue light from galaxies. Indeed, the proposed observations will provide the community with an unprecedented data set suitable for addressing a number of still open astrophysical questions, ranging from the main drivers of the HB morphology and the mass loss processes, to the origin of the UV upturn in elliptical galaxies, the dating of distant systems from integrated light, and the complex interplay between stellar evolution and dynamics in dense stellar aggregates. In the spirit of constructing a community resource, we entirely waive the proprietary period for these observations.

Proposal Category: G0

Scientific Category: STAR FORMATION
ID: 11976
Title: Particle separation in and expansion of the dust arcs of
the young star V1331 Cyg
PI: Bringfried Stecklum
PI Institution: Thuringer Landessternwarte Tautenburg (TLS)

HST-WFPC2 imaging of the young star V1331 Cyg revealed several dust arcs seen in scattered light which were caused by short-lived strong winds arising from FU Ori-like outbursts. Most notably the brightest outer arc is encircled by an expanding CO ring which implies that the otherwise extremely well mixed gas and dust components were separated according to particle mass. This is presumably due to the dependence of the wind ram pressure on the ratio of particle cross section and mass as well as the brief acceleration period. Thus, we suspect that a FU Ori outburst acts as a cosmic mass spectrometer. In order to verify this hypothesis, we apply for 2nd epoch imaging to reveal the color gradient across the bright dust arc which will be induced by the grain sorting. Furthermore, the current imagery will allow us to prove directly the expansion of the arc by measuring its proper motion. The proposed observations represent new diagnostics for what concerns studies of young stellar objects.

Proposal Category: G0
Scientific Category: ISM AND CIRCUMSTELLAR MATTER
ID: 11977
Title: WFPC2 12-Year Proper Motions of Two Galactic Analogs of
the SN1987A Rings
PI: Nathan Smith
PI Institution: University of California - Berkeley

This special call in Cycle 16 is a unique opportunity to measure fine-scale proper motions with the same WFPC2 camera after more than a decade has elapsed, and is the last time such an opportunity is likely to be available. We aim to apply this powerful tool to the ring nebulae around two hot supergiants: the set of ionized double-rings around the massive eclipsing binary RY Scuti, and the equatorial ring and bipolar lobes around Sher 25. These are the only two Galactic analogs of SN1987A for which this proper motion measurement is possible (others lack a first-epoch image with HST, and SN1987A is too distant). In the case of RY Scuti, the expected motions are small because the compact ring nebula is only 1-arcsec in diameter. For Sher 25 the expected motions are small because the object is thought to be at $d=6$ kpc. The 10-12 years that have elapsed since earlier imaging epochs for these sources make it possible to accurately measure their expected sub-pixel proper motion, and hence, their ages and distances. We can discriminate between specific proposed models for the formation of these ring nebulae by measuring the relative ages of these ionized equatorial rings compared to outer structures: the bipolar lobes in the case of Sher 25, and an outer dust shell in the case of RY Scuti. These will provide the first quantitative tests of binary merger vs. rapidly rotating single star models for the shaping of SN1987A and related ring nebulae around massive stars, which until now have relied upon qualitative comparisons to structures seen in single-epoch images. The expected expansion is less than 0.1 arcsec, so there is no hope of making either measurement from the ground, and increased systematic errors associated with switching to new instruments (with different pixel scales and distortion

corrections) will make this measurement more difficult even for HST after SM4.

Proposal Category: GO
Scientific Category: COSMOLOGY
ID: 11978
Title: Luminous and dark matter in disk galaxies from strong
lensing and stellar kinematics
PI: Tommaso Treu
PI Institution: University of California - Santa Barbara

The formation of realistic disk galaxies within the LCDM paradigm is still an unsolved problem. Theory is only now beginning to make predictions for how dark matter halos respond to galaxy formation and for the properties of disk galaxies. Measuring the density profiles of dark matter halos on galaxy scales is therefore a strong test for the standard paradigm of galaxy formation, offering great potential for discovery. However, from an observational point of view, the degeneracy between the stellar and dark matter contributions to galaxy rotation curves remains a major road block. Strong gravitational lensing, when coupled to spatially-resolved kinematics and stellar population models, can solve this long-standing problem. Unfortunately, this joint methodology could not be exploited so far due to the paucity of known edge-on spiral lenses. Exploiting the full SDSS-DR7 archive we have identified a new sample of exactly these systems. We propose multi-color HST imaging to confirm and measure a sample of twenty spiral lenses, covering a range of bulge to disk ratios. By combining dynamical lensing and stellar population information for this unique sample we will deliver the first statistical constraints on halos and disk properties, and a new stringent test of disk galaxy formation theories.

Proposal Category: GO
Scientific Category: EXTRA-SOLAR PLANETS
ID: 11979
Title: WFPC2 Imaging of Fomalhaut b: Determining its orbit and
testing for H-alpha emission
PI: Paul Kalas
PI Institution: University of California - Berkeley

Fomalhaut is a bright nearby star that harbors a belt of dusty material with a morphology that has been used to predict the presence of a shepherding planet. With ACS/HRC coronagraphy, we have achieved the direct detection of a planet candidate (Fomalhaut b) in F606W and F814W. The planet candidate lies 18 AU interior to the dust belt and we detect counterclockwise orbital motion in two epochs of observations (2004 and 2006). Fomalhaut b has mass no greater than three Jupiter masses based on an analysis of its luminosity, including non-detections at infrared wavelengths, and the dynamical argument that a significantly more massive object would disrupt the dust belt. Variability at optical wavelengths and the brightness in the F606W passband suggest additional sources of luminosity such as starlight reflected from a circumplanetary ring system. A second possibility that has been invoked for substellar objects is a significant contribution of H-alpha emission. Here we propose follow-up WFPC2 observations to test the possibility that the F606W flux is contaminated by H-alpha emission. We demonstrate that the detection

of Fomalhaut b using WFPC2 is feasible using roll deconvolution. Furthermore, a detection of Fomalhaut b in 2009 will provide a crucial third epoch for astrometry. With the existing two epochs of data, the orbit of Fomalhaut b cannot be determined uniquely. The third epoch will be used to test the prediction of apsidal alignment and more accurately determine the dynamical mass of Fomalhaut b. If apsidal mis-alignment is found between the planet and the belt, this result would point to the existence of still other planets lurking unseen in the Fomalhaut system.

Proposal Category: G0
Scientific Category: ISM IN EXTERNAL GALAXIES
ID: 11980
Title: Deep FUV Imaging of Cooling Flow Clusters
PI: Sylvain Veilleux
PI Institution: University of Maryland

We propose to take deep ACS FUV images of a carefully selected sample of 19 bright central galaxies in nearby galaxy clusters. This program is the last critical element of a comprehensive investigation of the impact of stellar and AGN feedback on the local galaxy cluster environment. The HST images will complement new, high-resolution, H α images obtained with the recently commissioned Maryland-Magellan Tunable Filter (MMTF) on the Baade 6.5m telescope, archival Chandra, VLA, and GALEX data, and on-going H2/NIR observations. The MMTF data have revealed unsuspected filamentary complexes in several systems. The GALEX data often show hints of extended NUV and FUV emission on a similar scale, but their poor spatial resolution prevents meaningful comparison with the MMTF data. The HST data will provide this much needed gain in resolution. The combined radio-H2-H α -FUV-X-ray dataset will allow us to derive with unprecedented precision the role of the AGN, hot stars, shocks, and relativistic particles on the excitation and thermodynamics of the multi-phase intracluster and interstellar media in these systems. This is an important question since the formation and evolution of most cluster galaxies have likely been affected by these processes.

Proposal Category: G0
Scientific Category: RESOLVED STELLAR POPULATIONS
ID: 11981
Title: FUV imaging survey of Galactic open clusters
PI: Jesus Maiz Apellaniz
PI Institution: Instituto de Astrofisica de Andalucia (IAA)

We propose a WFPC2 FUV imaging survey of 6 Galactic open clusters with ages ranging from 1 Myr to 300 Myr complemented with NUV/optical imaging of the same fields. No such survey has ever been attempted before in the FUV at the resolution of WFPC2 (indeed, no WFPC2 FUV images of any Galactic open cluster exist in the HST archive) and, since WFPC2 will be retired in SM4 and none of the other HST instruments can do FUV imaging of bright objects, this is the last chance to do such a survey before another UV telescope is launched. This survey will provide a new perspective on young/intermediate age Galactic clusters and a key template for the study of star formation at high redshift, where the intensity peak we observe in the optical/NIR from Earth is located in the FUV in its rest frame. For clusters still associated with an H II

region, UV imaging maps the continuum emission of the ionized gas and the radiation scattered by background dust and, combined with optical nebular images, can be used to determine the 3-D structure of the H II region. For all young clusters, FUV+NUV+optical photometry can be used to study the UV excesses of T-Tauri stars. For clusters older than ~40 Myr, the same photometric combination is the easiest method to detect companion white dwarfs which are invisible using only the optical and NIR. WFPC2 is also an excellent instrument to discover close companions around bright stars and improve our knowledge of their multiplicity fraction. Finally, for all clusters, the combination of high-spatial-resolution UV and optical photometry can be used to simultaneously measure the temperature, extinction, extinction law, distance, and existence of companions (resolved and unresolved) and, thus, produce clean HR diagrams with resolved cluster membership and much-reduced systematic uncertainties.

Proposal Category: G0
Scientific Category: QUASAR ABSORPTION LINES AND IGM
ID: 11982
Title: Spanning the Reionization History of IGM Helium: a Large and Efficient HST Spectral Survey of Far-UV-Bright Quasars
PI: Scott Anderson
PI Institution: University of Washington

The reionization of IGM helium is thought to have occurred at redshifts of $z=3$ to 4. Detailed studies of HeII Lyman-alpha absorption toward a handful of QSOs at $2.7 < z < 3.3$ demonstrated the high potential of such IGM probes, but the small sample size and redshift range limit confidence in cosmological inferences. The requisite unobscured sightlines to high- z are extremely rare, but we've cross-correlated 10,000 $z > 2.8$ SDSS DR7 (and other) quasars with GALEX GR4 UV sources to obtain 550 new, high confidence, sightlines potentially useful for HST HeII studies; and in cycle 15-16 trials we demonstrated the efficacy of our SDSS/GALEX selection approach identifying 9 new HeII quasars at unprecedented 67% efficiency. We propose the first far-UV-bright HeII quasar survey that is both large in scale and also efficient, via 2-orbit reconnaissance ACS/SBC prism spectra toward a highly select subset of 40 new SDSS/GALEX quasars at $3.1 < z < 5.1$. These will provide a community resource list that includes 5 far-UV-bright (restframe) HeII sightlines in each of 8 redshift bins spanning $3.1 < z < 3.9$ (and perhaps several objects at $z > 4$), enabling superb post-SM4 follow-up spectra with COS or STIS. But simultaneously and independent of any SM4 uncertainties, we will hereby directly obtain 10-orbit UV spectral stacks from the 5 HeII quasars in each of the 8 redshift bins to trace the reionization history of IGM helium over at least $3.1 < z < 3.9$. These spectral stacks will average over cosmic variance and individual object pathology. Our new high-yield HeII sightline sample and spectral stacks, covering a large redshift range, will allow confident conclusions about the spectrum and evolution of the ionizing background, the evolution of HeII opacity, the density of IGM baryons, and the epoch of helium reionization.

Proposal Category: G0
Scientific Category: STAR FORMATION

ID: 11983
Title: An Imaging Survey of Protoplanetary Disks and Brown
Dwarfs in the Chamaeleon I region
PI: Massimo Robberto
PI Institution: Space Telescope Science Institute

We propose to carry out a HST/WFPC2 survey of young brown dwarfs, Class I and Class II sources in the Chamaeleon I region, one of the best-studied star-forming regions, in order to investigate the link between disk evolution and the formation of substellar-mass objects. We will use deep broad-band imaging in the I and z-equivalent HST bands to unveil the unknown population of substellar binary companions, down to a few Jupiter masses for separations of a few tens of AU. We will also perform narrow-band imaging to directly detect accreting circumstellar disks and jets around brown dwarfs, Class-I and class-II objects. Chamaeleon I is nearly coeval of Orion (~1-2Myr) but at ~1/3 its distance, allowing 3x higher resolution and 10x more flux for comparable objects. Unlike Orion, low-mass objects and protoplanetary disks in Chamaeleon I have been extensively studied with Spitzer, but not yet with the HST. The Chamaeleon I region is an ideal HST target, as it lies in the CVZ of the HST and therefore it is easily accessible any time of the year with long orbits.

Proposal Category: G0
Scientific Category: SOLAR SYSTEM
ID: 11984
Title: Observing Saturn's high latitude polar auroras
PI: Jonathan Nichols
PI Institution: University of Leicester

Planetary auroral emissions are critical indicators of how the magnetospheres of the planets work. Recently, a new component of Saturn's auroral emissions, i.e. high latitude auroras inside the main auroral oval, have been observed by the Cassini spacecraft during otherwise quiet auroral conditions. Such high latitude auroras are of immense interest since they occur on magnetic flux tubes connected to a region that is key to the overall dynamics of the system, the magnetotail, and where if conventional theories regarding Saturn's magnetosphere are correct there should not be any auroras. These faint auroral emissions have not been previously observed by the Hubble Space Telescope (HST). However, the unique oblique viewing geometry afforded during early 2009 due to Saturn's orbital longitude will result in the apparent brightening of these polar emissions due to the limb-brightening effect, with the result that they may be observable by HST for the first ever time. In addition, at this time the Cassini spacecraft will be in a high latitude orbit, with a trajectory that will take it through these magnetic flux tubes, providing essential simultaneous in situ data. This is the last time Cassini will be in such an orbit during its mission as currently scheduled and HST is the only instrument capable of obtaining sustained long-term observations of Saturn's auroras. These observations will address the following: Does Saturn exhibit high latitude UV auroras observable by HST? Where do these auroras occur, and at what altitude? How do these auroras behave over time? How variable are they? Are they periodic? How do they behave with respect to other auroral components? What processes drive these auroras? Are these auroras generated by processes internal to the magnetosphere or are they driven by the solar wind? How do the infrared (IR) auroras relate to the

ultraviolet (UV) auroras?

Proposal Category: G0
Scientific Category: ISM AND CIRCUMSTELLAR MATTER
ID: 11985
Title: Polarimetric WFPC2 Imaging of the Dust Torus around the
Born-Again Star V605 Aquilae
PI: Geoffrey Clayton
PI Institution: Louisiana State University and A & M College

We propose the first WFPC2 polarimetric imaging of the ejecta surrounding the helium shell final flash (FF) star V605 Aql. Polarimetry is a novel, little-used capability of WFPC2, which can provide confirmation of our proposed morphology of the compact ejecta. Evolutionary models suggest that V605 Aql is experiencing a very late and very fast thermal pulse. Its evolution from a PN central star on the white-dwarf cooling track, to a cool luminous giant, and then back again, took place in only a few decades or less. V605 Aql, central star of the large, faint, and old planetary nebula A 58, has evolved from a hot central star before the 20th century, to $T_{\text{eff}} = 5000$ K in 1921, and back to 95,000 K at the present time. A compact, but resolved, dusty nebula lies at the site of V605 Aql. In addition to an extremely hydrogen-deficient nebular emission spectrum, this knot shows stellar features, even though no star-like object is seen within the knot. Therefore, we are probably seeing light from the star scattered around the edge of a thick dust torus viewed nearly edge-on, ejected during the FF event in the early 20th century. Why a star that had already reached the top of the white-dwarf cooling track, and then expanded to become a red giant again, would be capable of such non-spherical ejection is one of the leading mysteries in late stellar evolution. We will use the high resolution of the WFPC2 PC chip to investigate the nature of the V605 Aql torus, employing filters that isolate nebular emission lines. The novel feature of our program is polarimetric imaging in the WF2 chip, using a filter that isolates scattered starlight and rejects nebular emission. If our model is correct, this scattered starlight will be very highly polarized. We will also measure the angular expansion rate of the central knot to constrain the distance. V605 Aql is a unique link between the young FF star Sakurai's Object (10 years old), and the extended FF objects A30 and A78 (few 1000 years old).

Proposal Category: G0
Scientific Category: UNRESOLVED STELLAR POPULATIONS AND GALAXY STRUCTURE
ID: 11986
Title: Completing HST's Local Volume Legacy
PI: Julianne Dalcanton
PI Institution: University of Washington

Nearby galaxies offer one of the few laboratories within which stellar populations can be tied to multi-wavelength observations. They are thus essential for calibrating and interpreting key astrophysical observables, such as broad-band luminosities, durations and energy input from starbursts, and timescales of UV, H-alpha, and FIR emission. The study of stellar populations in nearby galaxies requires high-resolution observations with HST, but HST's legacy for this limited set of galaxies remains incomplete. As a first

attempt to establish this legacy, The ACS Nearby Galaxy Survey Treasury (ANGST) began observations in late 2006. ANGST was designed to carry out a uniform multi-color survey of a volume-limited sample of ~70 nearby galaxies that could be used for systematic studies of resolved stellar populations. The resulting data provide nuanced constraints on the processes which govern star formation and galaxy evolution, for a well-defined population of galaxies. All photometry for the survey has been publicly released. However, the failure of ACS 4.5 months after ANGST began taking data led to a drastic reduction in the planned survey. The loss is two-fold. First, the goals of completeness and uniformity were greatly compromised, impacting global comparison studies. Second, the variety of observed star formation histories was reduced. Given that we have never found two galaxies with identical star formation histories, and fully sampling the population allows us to catch those few systems whose star formation rates and metallicities place the strongest constraints on key astrophysical processes. Here we propose WFPC2 observations of all remaining galaxies within the Local Volume ($D < 3.5 \text{ Mpc}$) for which current HST observations are insufficient for meaningful stellar population studies. We will use these observations for research on the star formation histories of individual galaxies and the Local Volume, detailed calibrations of star formation rate indicators, and the durations of starbursts. We will also make them publicly available through the ANGST archive to support future research. The proposed observations will finally complete a lasting legacy of HST observations of nearby galaxies, matching investments made by other observatories at other wavelengths.

Proposal Category: G0
Scientific Category: UNRESOLVED STELLAR POPULATIONS AND GALAXY STRUCTURE
ID: 11987
Title: The Recent Star Formation History of SINGS Galaxies
PI: Michael Regan
PI Institution: Space Telescope Science Institute

We propose to extend the SINGS Spitzer Legacy Survey, providing the high resolution HST observations (especially in the U-band and H-alpha) necessary for understanding the details of star formation in galaxies. The SINGS Spitzer Legacy Survey collected IR & some multi-wavelength data for 75 nearby galaxies, covering the entire range of galaxy types from elliptical to spiral to irregular and dwarf galaxies. It has already produced breakthrough science, especially the creation of star formation diagnostics that are independent of the dust content. However, the relatively low resolution of the existing SINGS data does not allow one to directly probe the stars that are the ultimate source of most ionizing photons in galaxies. While a patchwork of HST observations already exist in V and I for many SINGS galaxies, here we propose to obtain the critical U, B and H-alpha observations, and to hence provide a uniform UBVH-alpha dataset that will greatly enhance the legacy value of the SINGS dataset. This filter set is ideal to find and determine the properties of stars, both in the field and in clusters. Our main science goals are to: (1) determine the recent star formation history in SINGS galaxies; (2) compare the location and strength of star formation within galaxies with the local ISM and dynamical structures such as bars and spiral arms; (3) study emission-line and dust morphologies on scales of parsecs (i.e., with ~20-50 times the spatial resolution of SPITZER) in order to shed light on the physical processes at work within galaxies; (4) use the evolution of the cluster mass

function to test the role played by the local ISM in the formation and disruption of star clusters. The proposed observations will also enable the community to address a wide range of other topics ranging from the mass function of stars to the use of these galaxies as templates for high-z objects. In this spirit, we waive the proprietary period to make the data immediately available. Over 1000 hours of Spitzer and HST observing time have already been dedicated to observations of the SINGS sample. By adding a relatively small fraction of this time we will greatly extend the utility of this important dataset.

Proposal Category: G0
Scientific Category: RESOLVED STELLAR POPULATIONS
ID: 11988
Title: Searching for Intermediate Mass Black Holes in Globular Clusters via Proper Motions
PI: Rupali Chandar
PI Institution: University of Toledo

The unambiguous detection of an intermediate mass black hole (IMBH) in a globular star cluster would be a major achievement for the Hubble Space Telescope. It is critical to know whether or not IMBHs exist in the centers of clusters in order to understand the dynamical evolution of dense stellar systems. Also, an IMBH detection would prove the existence of BHs in an entirely new mass range. Observationally, the search has been hampered by the low number of stars with known velocities in the central few arcseconds. This limits measurements of the stellar velocity dispersion in the region where the gravitational influence of any IMBH would be felt. Existing IMBH claims in the literature have all been called into question, and have all been based on line-of-sight velocities from spectroscopy. In cycle 13, we obtained ACS/HRC observations for 5 nearby Galactic globular clusters for a new proper motion study. Here, we request WFPC2/PC observations of these clusters, all of which are observable in Feb-May 2009. This 4 year baseline will allow us to measure the proper motions of stars into the very center of each cluster, and either detect or place firm constraints on the presence of an IMBH. In addition, we will determine whether or not the clusters rotate or show any anisotropy in their motions. Our small (<75 orbit) program meets the criteria of addressing high-impact science (IMBH detection) using innovative methods (proper motions).
