prop_num	pi_lname	title	Abstract
71313	CHARLES	DISENTANGLING DARK MATTER GAMMA-RAY SIGNALS FROM ASTROPHYSICAL FOREGROUNDS: COMBINING SEARCHES IN A PUBLIC FRAMEWORK	We describe a framework to perform and combine searches for gamma-ray emission from weakly interacting massive particles (WIMPs) for several different search targets. We argue that it is both feasible and highly desirable to use such a framework and describe a three step procedure we will use to extract constraints on dark matter (DM) signals: (i) establish baseline models of the Galactic and isotropic diffuse emission from astrophysical sources, and estimates of the uncertainties of those models, (ii) quantify the local contributions to the likelihood for a specific gamma-ray excesses in each direction in the sky as a function of energy and (iii) constrain DM models by combining the prediction of the gamma-ray emission of those models with these pre-calculated likelihood curves.
71155	MARSCHER	CONTINUED MONITORING OF GAMMA-RAY BLAZARS WITH THE VLBA AT 43 GHZ	The investigators propose to continue their monitoring of 36 gamma-ray and radio bright active galactic nuclei with the VLBA and the Fermi-LAT. The total and polarized intensity VLBA images at 43 GHz reveal events in the parsec-scale jet - superluminal knot ejections and flares in the knots and core region - associated with flares at gamma-ray and other wavebands. Together with multi-waveband data, this determines the location of the flaring site, crucial to our understanding of the physical processes involved. Continued observations of the previous sample will reveal any repeated patterns, as well as highlight differences between radio and gamma-ray events that are related and those that are not. The images and calibrated VLBA data are providing an extremely valuable legacy dataset.
71090	READHEAD	HIGH-CADENCE MONITORING OF ~1830 AGN FOR FERMI-GST WITH THE OVRO 40 M (15GHZ) AND TWO 27 M (1-20GHZ) TELESCOPES	Our twice-weekly 15 GHz monitoring of ~1830 AGN on the 40 M Telescope is by far the most intensive ever AGN monitoring campaign. Typical timescales of AGN activity range from weeks to years, making this proposed extension to the monitoring campaign crucial. The 40 M will observe fulltime. In addition the OVRO 27 M interferometer will observe 40 hr/wk at 1-20 GHz. Preliminary indications from our analysis of the correlation between radio and gamma-ray emission are that the gamma-ray emitting regions lie upstream of the radio emitting regions in the AGN jet. We expect a definitive confirmation of this finding with the observations requested herein. The OVRO data from 2008 onwards are publicly available on the web, updated monthly, and being widely used, especially in Fermi-GST & TeV papers.

71238	BAILYN	SMARTS OPTICAL AND NEAR-INFRARED MONITORING OF FERMI LAT BLAZARS	Blazars are AGN in which a relativistic jet is directed toward the observer resulting in Doppler boosting. Much of the spectral energy distribution of these sources is dominated by the jet. Thus blazars are key to understanding the physics of relativistic jets. Several blazars have exhibited remarkable gamma-ray flares that are also observed in optical/near-infrared (O/IR) wavelengths. Simultaneous data provides strong constraints on the geometry and physical conditions of the jet-emitting plasma. Here we propose to monitor the ensemble of gamma- ray bright blazars with ground-based O/IR telescopes so that no opportunity for obtaining well-studied flares is missed.
71330	BARING	THE IMPACT OF PAIR CREATION ATTENUATION ON THE CRAB PULSAR SPECTRUM	A major portion of the Fermi mission's legacy is centered on its approximately twenty-fold increase in the gamma-ray pulsar database. The LAT's impressive spectroscopy has identified exponential maximum energy turnovers in the 1-8 GeV window in the majority of Fermi pulsars. The Crab pulsar is a remarkable exception, exhibiting a broken power-law structure at the upper end of the Fermi-LAT window that extends beyond 120 GeV as determined by VERITAS and MAGIC. This project will interpret the Crab spectrum via an exploration of the opacity due to magnetospheric two-photon pair creation. The goal is to determine at what altitudes the observed spectral break can be created, and whether this diagnostic can discriminate between slot gap and outer gap locales for the Crab's gamma-ray activity.
71303	BARTHELMY	GCN/TAN: ENHANCING FERMI GRBS & TRANSIENTS BY ENABLING REAL-TIME FOLLOW-UPS	We propose to continue the operation of the Gamma-ray Coordinates Network / Transient Astronomy Network (GCN/TAN) for two more years. This work will focus on the operational needs of the Fermi Team, adjust any existing Fermi-based notice types, adding any new Fermi notice types, and including the distribution of the existing Fermi notices. And because of its all-things-transient nature, GCN/TAN greatly and efficiently enhances correlated multi-wavelength observations between Fermi-/GBM/-LAT observations and all the other space-based and ground-based observatories, instruments, and operations.
71095	BERGER	RAPID SPECTROSCOPY OF FERMI GRBS: REDSHIFTS, ENERGETICS, AND HOST GALAXIES	Rapid spectroscopy of GRB afterglows enables a wide range of studies related to basic GRB physics (redshifts, energetics), the progenitors (metallicities), the properties of high-redshift galaxies (chemical abundances), and potentially fundamental physics (Lorentz invariance violation). As such, rapid spectroscopy is the most essential correlative observation for Fermi GRB studies. Here we request support for our rapid spectroscopy program (using Gemini, Magellan, MMT), which will provide redshifts and metallicities. We will further combine the redshifts with late-time EVLA observations to determine beaming-independent energies for Fermi GRBs, and assess whether Fermi and Swift bursts probe the same population. The data will be released to the community in real-time via GCN circulars.

71081	BOGDANOV	OPTICAL AND GAMMA-RAY MONITORING OF PSR J1023+0038 AND OTHER X-RAY BINARY/RECYCLED PULSAR TRANSITION OBJECTS	We propose to conduct long-term optical photometric and spectroscopic observing campaigns in concert with a gamma-ray variability study of the ``redback'' millisecond pulsar binary J1023+0038, which recently transformed to an X-ray binary-like state. The behavior of J1023+0038 suggests that similar objects may also sporadically revert to an accreting phase. Thus, we further propose optical monitoring of the five nearby analogs of J1023+0038 in the field of the Galaxy aimed at "catching them in the act" of switching to an accreting state. The proposed efforts would greatly aid in understanding key aspects of recycled pulsar formation and evolution.
71210	CAMILO	MILLISECOND PULSAR SEARCHES AT ARECIBO IN UNIDENTIFIED FERMI SOURCES AT HIGH LATITUDES	Fermi is revolutionizing the study of pulsars. Fermi-LAT has identified 132 pulsars, including the new class of gamma-ray-emitting millisecond pulsars (MSPs). Many of these have been discovered worldwide in radio searches of unidentified LAT sources at high Galactic latitudes. Until recently Arecibo had not participated in these efforts. The discovery of 5 such MSPs at Arecibo in 2013 shows that it is now poised to make a substantial contribution to the field. We propose to search 54 high-latitude sources from the preliminary 3FGL list based on 4 years of data. We will observe each source 3 times at 327 MHz to counter the effects of scintillation, eclipses, and orbital acceleration, which diminish the chance to detect MSPs. Our survey will be the most sensitive such work done anywhere.
71261	CAPRIOLI	GAMMA-RAYS FROM SUPERNOVA REMNANTS: A MULTI-SCALE APPROACH	We will develop a multi-scale model for ion and electron acceleration in supernova remnants (SNRs), in order to understand the gamma-ray emission observed by Fermi. More precisely, we will study: i) the microphysics of plasma instabilities induced by energetic ions, and particle injection, via ab-initio kinetic simulations; ii) the large-scale SNR phenomenology (shock dynamics and broadband emission), via a fast and accurate semi-analytical approach able to account for the nonlinear back reaction of accelerated particles and amplified magnetic fields. The semi-analytical code will be improved by including current and constantly updated prescriptions from simulations, and made publicly available as a novel and versatile tool named CRAFT (Cosmic-Ray Fast Analytical Tool).
71302	CENKO	AFTERGLOWS, REDSHIFTS, AND ENERGETICS OF FERMI-LAT GRBS	We propose here to continue our successful program to provide complementary multi-wavelength observations of well-localized gamma-ray bursts (GRBs) detected by the Fermi Large Area Telescope. Specifically, our program is designed to 1) identify long-wavelength (optical and radio) counterparts, 2) obtain spectroscopic redshifts, and 3) measure beaming-corrected energies (burst plus afterglow) of Fermi-LAT GRBs. This study will provide us with new insights into the least understood aspect of GRBs -- the central engines -- by constraining the maximum energy available for progenitor models (e.g., magnetars and black holes).

71255	CHEUNG	PROMPT FOLLOW-UP OF FLARING/TRANSIENT FERMI-LAT GALACTIC PLANE SOURCES	We propose a comprehensive search and follow-up program of flaring/transient Fermi-LAT Galactic plane gamma-ray sources. Essential to this effort are the VLA observations requested here. At high-significance (>=5 sigma), we expect 2-3 all-sky events/year, with ~2/3 visible with the VLA, thus request up to 2 ToOs. Together with pre-approved Swift XRT/UVOT observations, we aim to identify plausible radio, X-ray, and optical counterparts following the LAT event via expected correlated variability. In case a plausible VLA counterpart is identified, we will obtain further radio follow-up with our OVRO and LWA1 partners. After the successful discovery of novae as a class of GeV emitters, these coordinated observations will enable us to uncover even rarer types of Galactic gamma-ray transients.
71314	CHEUNG	INVESTIGATING GRAVITATIONAL LENSES IN GAMMA-RAYS WITH FERMI-LAT	The recent LAT gamma-ray measurement of a time delay of 11.5 days in the gravitationally lensed blazar B0218+357 opens up a number of exciting avenues for further pursuit. We propose a systematic two-year study aimed at optimizing LAT light curve extraction and timing analysis methods suited for measuring gravitational lens time delays in gamma-rays. This work will refine the delay measurement for B0218+357 and quantify any systematic lower-significance timing features. The overall sample to be studied include all known radio-loud lensed systems as well as other known gamma-ray sources (AGN and unidentified) that are not yet known to be gravitationally lensed.
71280	CHOMIUK	TEMPESTS, NOT BOMBS: THE COMPLEX, PROLONGED EXPLOSIONS OF NOVAE	Coordinated multi-wavelength observations of classical novae elucidate the kinematics and mass-loss history of the nova ejecta, and are vital for understanding the origin of the as-yet-unexplained gamma-ray emission detected by Fermi-LAT in five novae to date. We request support for our VLA monitoring of gamma-ray novae through the Fermi-NRAO cooperative agreement. Our Large NRAO Program, approved in late 2013, forms the cornerstone of a coordinated campaign spanning the electromagnetic spectrum, and is shedding important light on the energetics, kinematics, and morphology of nova ejecta. The requested support will ensure the maximum impact of our continued monitoring of known Fermi-detected novae, and prompt observations and monitoring of new sources.

71220	DENEVA	SEARCHING FOR MILLISECOND AND YOUNG PULSARS IN LOW-LATITUDE FERMI UNIDENTIFIED SOURCES	We propose to use the Arecibo telescope to search for pulsars in Fermi unidentified sources close to the Galactic plane. Such searches have been extremely successful at high Galactic latitudes. The proposed search targets a pristine set of sources because it is the first at low Galactic latitudes since the early days of the mission and the first edition of the Fermi source catalog. It is also the first low-latitude search of Fermi unidentified sources with the most sensitive radio instrument in the world, the Arecibo telescope. The benefits of potential discoveries include rare young pulsars, tests of theories of gravity, facilitating gravitational wave detection, studying the pulsar emission mechanism at a range of energies, and detecting high-energy relativistic shock emission.
71289	DOTSON	FINDING THE BLAZAR GEV PHOTON ORIGIN WITH FERMI LIGHT CURVES	The location of the GeV flaring in Fermi powerful blazars is a critical question with no definite answer, central to our understanding jet formation and collimation as well as particle acceleration. We have developed a method to localize these GeV flares using the energy-dependence of flare decay times in Fermi light curves. Our initial application shows intriguing results for the November 2010 flare of 3C 454.3 (the brightest flare recorded by Fermi) and a March 2009 flare of PKS 1510-089 (an object that frequently emits bright flares). According to our diagnostic the GeV emission zone is within 1.5 pc of the black hole for 3C 454.3 and within 4.5 pc for PKS 1510-089. We propose to apply this method to the brightest Fermi flares to definitively understand the origin of the GeV photons.
71212	FALCONE	SYSTEMATIC SEARCH FOR X-RAY COUNTERPARTS OF FERMI-LAT UNASSOCIATED SOURCES USING SWIFT: NEW BLAZARS, PULSARS, AND MORE	Motivated by the new 3FGL catalog, we propose to use Swift to search for X-ray and UV/optical counterparts of unassociated Fermi sources. Previous programs led to Swift observations of 261 and 199 Fermi unassociated sources from the 1FGL and 2FGL catalogs, respectively. Possible x-ray counterparts are found in ~1/3 of these. These data will determine the basic properties (with ~5 arcsec positions) of all detected X-ray sources in the Fermi-LAT localization circles, thus enabling identification, classification, and follow-up. This proposal supports the large analysis and interpretation task, which will require additional data reduction software. The Swift PI and Executive Committee commit to the required Swift observing time. Reduced data will be made publicly available to everyone.

71279	FALCONE	LONG-TERM SIMULTANEOUS OPTICAL/X-RAY/GAMMA-RAY SPECTRA AND LIGHT CURVES OF BLAZARS	This proposal will enable long-term low-high state multiwavelength coverage, specifically Swift data, on the Fermi monitored source list and many other blazars and transients. We will also obtain deeper simultaneous Swift data during high states from these sources or from any other new sources that exceed this threshold, thus triggering larger monitoring campaigns. Enhancement of this previously successful effort is needed for long-term multi-band correlation and emission studies in low through high states. Observations will be coordinated with other observatories, maximizing the science return and providing public reduced. This effort provides a real-time public service and an archival legacy project for all researchers of these high interest sources (available at www.swift.psu.edu/).
71244	FINGER	STUDIES OF ACCRETING BINARY PULSARS WITH THE FERMI GAMMA-RAY BURST MONITOR IN CYCLE 7	Since Cycle 1 we have been monitoring accreting pulsars using the Gamma-Ray Burst Monitor on Fermi. This monitoring program includes daily full sky searches for previously unknown or quiescent pulsars using a blind search, and making source specific analyses to track the frequency evolution of all detected pulsars. Quick-look results are plotted on our website and available in fits files while refined long-term histories of pulse profile, pulsed flux, and frequency are available by request, and will be archived. We propose to continue this monitoring. We also propose studies of the transient Be/X-ray pulsar RX J0520.5-06932 in the LMC, and the transient bursting LMXB pulsar GRO J1744-28, both of which are currently active.
71173	FURNISS	USING GAMMA-RAY BLAZARS FOR COSMOLOGICAL INSIGHT	Gamma-ray blazars are among the most extreme astrophysical sources, harboring energetic phenomena far beyond that attainable by terrestrial accelerators. Determination of the origin of ultra-high-energy cosmic rays (E>1 PeV), the density and evolution of the extragalactic background light (EBL) and evidence for exotic axion-like particles is possible through the combination of deep Fermi LAT and VERITAS observations of seven moderate-opacity-probing very-high-energy (VHE; E>100 GeV) blazars. The combination of these data will allow a clear view of the intrinsic emission and the search for opacity-specific spectral hardening, which, assuming a low EBL photon density, has already been significantly detected at moderate opacities for two distant VHE blazars PKS 1424+240 and PG 1553+113.
71377	GUIRIEC	TOWARDS A BETTER UNDERSTANDING OF THE GRB PHENOMENON: A NEW MODEL FOR GRB PROMPT EMISSION	With Fermi, we have been entering a new Era for the study of the prompt emission of GRBs. Prompt emission spectral shapes are more complex than the simple empirical functions used in the past. All Fermi GRBs seem to be adequately fitted with a combination of three distinct components. We propose to study in details the components of this new model and follow their evolution with time in order to understand their origin and nature. With those results, we will study the composition of GRB jets, particle acceleration processes within the jets as well as of the origin of the energy reservoirs powering the jets. This will inform subsequently on the nature of the central engine.

71096	GWON	SIMULATION AND VALIDATION OF TERRESTRIAL GAMMA-RAY FLASH OBSERVATIONS BY FERMI	Terrestrial gamma-ray flashes (TGFs) are intense bursts of radiation emitted from the discharge of thunderclouds. Though significant progress has been made in understanding their phenomenology, the study of TGFs is still a developing field with several key questions still unanswered. Recently, we have successfully performed simulations using Geant4 in the SWORD graphical framework to reproduce previous calculations of key physical parameters with respect to TGFs performed using specialized Monte Carlo codes. We propose to extend the use of Geant4 to perform simulations from the generation of TGFs to the detector response of the Fermi LAT and GBM to TGFs, comparing both spectral and temporal properties of events incident on the instruments
71391	HEWITT	SYSTEMATIC STUDY OF SPECTRAL BREAKS IN SUPERNOVA REMNANTS	Fermi has made significant contributions in support of the supernova remnant (SNR) paradigm for Galactic cosmic ray (CR) origins. A key uncertainty in the SNR paradigm is how CRs escape from their sources. Several SNRs interacting with MCs have already been identified by Fermi-LAT, but there has not been a comprehensive survey of all such cases to identify and explain their GeV spectral curvature, which directly relates to the physics of CR escape. We propose a spectral survey of 32 SNRs detected by both Fermi-LAT and Planck. Detections of both radio and GeV curvature allow us to discriminate between hadronic and leptonic mechanisms in single-zone models. For 5 select SNRs we propose high-resolution GBT observations which will support detailed modeling of these sources.
71185	KOCEVSKI	A SYSTEMATIC STUDY OF THE VARIABLE GAMMA-RAY SKY	We propose to apply the Fermi All-sky Variability Analysis (FAVA) to systematic study of the variability of the gamma-ray sky, with a focus on the detection of new Galactic plane transients. This novel technique searches over a grid of regions on the sky for deviations from the expected flux based on the long-term mission average. Unlike the traditional likelihood analysis, FAVA is independent of any model for the diffuse gamma-ray emission and is computationally inexpensive, allowing us to easily search for flux variations over the entire sky and over a range of energy bands and timescales. We also propose to create a public FAVA webpage in order to make the resulting sky maps and relative light curves publicly available.

71346	KOUVELIOTOU	MAGNETAR OBSERVATIONS WITH THE FERMI/GAMMA RAY BURST MONITOR	Between 2008-2013 we detected 8 magnetars (discovered 2); produced the 5-year GBM magnetar burst catalog; observed the smallest hot spot on a NS surface; found SGR-like bursts from a low B-field NS; revealed new trends in the burst Epeak vs flux/fluence correlations; estimated the maximum extent of magnetar atmospheres to be 10m; established that burst spectra are best fit with 2 BB functions; discovered QPOs in typical bursts. These results are reported in 16 papers and multiple meetings. In the next two years we will probe the differences between AXP and SGR bursts; perform burst morphological studies; continue magnetar seismology; monitor known and discover new sources and study the magnetar population; combine GBM with NuSTAR, LOFAR, MWA, aLIGO; hopefully detect a new Giant Flare.
71365	KULKARNI	DISCOVERING GBM GRB AFTERGLOWS WITH IPTF	Here we propose a two-year joint program between the Gamma-Ray Burst Monitor (GBM) aboard Fermi and the intermediate Palomar Transient Factory (iPTF) to systematically identify the optical afterglows of GBM gamma-ray bursts (GRBs). As demonstrated by our first three GBM-iPTF discoveries, the large field-of-view, robotic operations, and transient detection software pipeline make iPTF the ideal tool for such an effort. The unique capabilities of the GBM offer access to at least three scientifically compelling GRB samples in greatly expanded numbers: rare, nearby events; bright, highly-collimated outflows; and, short-hard bursts. In addition, we see this as a valuable service to the entire Fermi GRB community as our localizations and redshift benefit all GBM GRB studies.
71296	MALYSHEV	A STUDY OF THE DIFFUSE GAMMA-RAY EMISSION NEAR THE GALACTIC CENTER	The Galactic center region is one of the most interesting and challenging to study. Recently, there have been several claims of an excess gamma-ray emission near the Galactic center. The interpretation of this emission crucially depends on the Galactic foreground modeling. We propose to use two different methods to refine the diffuse models for the region near the Galactic center to (i) check whether the reported excess is due to imperfect foreground modeling; (ii) determine the spectrum and morphology of the excess and their systematic uncertainties; (iii) use this information to discriminate possible physical interpretations of the excess. The latter include a cosmic-ray enhancement near the Galactic center, a large population of weak point sources, and a dark matter annihilation signal.

71323	MERTSCH	STOCHASTIC ACCELERATION BY TURBULENCE IN THE FERMI BUBBLES	The discovery of the Fermi bubbles - a huge bilobular structure seen in GeV gamma-rays above and below the Galactic center - implies the presence of a huge reservoir of high energy particles at tens of kpc distances from the disk. The absence of evidence for a strong shock coinciding with the edge of the bubbles, and constraints from multi-wavelength observations point towards stochastic acceleration (SA) by turbulence as a more likely model of acceleration. We propose a detailed analysis of acceleration of electrons and protons in such a model that will satisfy all spectral and morphological features of the bubbles. We also propose a dedicated data analysis that will allow testing the SA model, thus shedding light on the origin of the Fermi bubbles.
71164	METZGER	GAMMA-RAY NOVAE AS PROBES OF SHOCK ACCELERATION	The unexpected discovery by Fermi LAT of ~100 MeV gamma-rays from classical novae illustrates that shocks and high energy particle acceleration are common in nova outflows. A model will be developed for nova shocks and their multi-wavelength thermal and non-thermal emission that includes for the first time important effects such as radiative cooling of the shocked gas, a self-consistent treatment of the ionization of the unshocked medium, and the effects of relativistic particles and magnetic fields on the compressibility and emission of the post shock gas. Fermi detections of novae will be used in combination with multi-wavelength observations to constrain the efficiency/spectrum of non-thermal particle acceleration and magnetic field amplification in non-relativistic shocks.
71265	NIETO CASTANO	UNCOVERING DARK MATTER SUBHALOS WITH FERMI-LAT AND VERITAS	Assuming a hypothetical dark matter (DM) particle that could annihilate or decay producing observable very high energy (VHE, E>100 GeV) gamma-ray photons, we propose multiwavelenght characterization of unassociated Fermi sources from the Second Fermi-LAT Source Catalog (2FGL) which, after a systematic search for potential dark matter subhalos in our Galaxy, turned out to be the best candidates to be observed with VERITAS. We propose two intriguing targets: the 2FGL sources J0545.6+6018, and J1115.0-0701. For these DM subhalo candidates we plan observations over a range of wavelengths, including optical (MDM Observatory), X-ray (Swift-XRT), and gamma-ray (VERITAS) bands. We also propose to improve the search for DM subhalo candidates in the LAT datapool by exploiting up-to-date Pass7 data

71326	OJHA	TANAMI MONITORING OF SOUTHERN HEMISPHERE FERMI AGN	TANAMI is the only dual-frequency VLBI program targeting a large sample of extragalactic jets in the southern third of the sky where many important gamma-ray loud AGN are located. It is achieving its stated mission of providing critical jet parameters, tracking parsec-scale components and associating changes in parsec-scale properties of Fermi/LAT detected sources with flaring activity across the whole spectrum. Additional observations will allow us to track changes and correlations in a statistically significant sample over different gamma-ray states. This is crucial for addressing many of the remaining unanswered questions on AGN physics and optimizing the science output from the second half of the Fermi/LAT mission.
71267	OMODEI	ANALYSIS OF SOLAR FLARES AT HIGH ENERGY WITH FERMI-LAT: TOWARD THE FIRST CATALOG	The Fermi LAT is the most sensitive instrument ever deployed for observing high-energy gamma-ray emission, and thus, the most sensitive instrument to study the proton spectrum above 300 MeV at the Sun. The study of solar flares at high energies is a unique opportunity to understand in detail how particles are accelerated in the presence of strong magnetic fields or by strong shocks. We propose both to continue our successful analysis of flares, extending it to all LAT detections (now more than 30), and to cross-correlate our results with the characteristics of the active region, the loop structure, the Coronal Mass Ejection, and the Solar Energetic Particles (if any) associated with the flare. With this proposal, we will release the first catalog of solar flares at high-energy gamma rays.
71172	OTTE	SEARCHING FOR A CORRELATION BETWEEN THE GEV FLARES AND VHE EMISSION FROM THE CRAB NEBULA	The discovery of gamma-ray flares from the Crab stands out from the large number of Fermi-LAT results that have revolutionized our view of the high-energy gamma-ray sky. The detection of the flares has taught us that fast varying processes are at work in the Crab that do not conform to the standard magnetohydrodynamics (MHD) model and the diffusive shock acceleration models applied to explain Crab Nebula. What these new processes are is still not known despite intense observational and theoretical efforts. However, various possible mechanisms had been proposed. Observations at other wavelengths can help to reveal the origin of the flares. Here we propose the continuation of a ToO program with the VERITAS Cherenkov telescope array to perform simultaneous observations in the TeV band during

71017	PINER	COMPLETION OF AN EXPANDED SAMPLE OF TEV BLAZARS AS SEEN BY THE UPGRADED VLBA	We propose to continue our VLBA studies of TeV-detected High-Frequency Peaked BL Lac Objects (HBLs), nearly all of which are also Fermi sources. The jets in these HBLs are fundamentally different from the more powerful blazars, and they are not well studied by other VLBA programs. We recently completed pilot VLBA observations of 12 new TeV blazars during our Cycle 6 Fermi program, and jet structure was found in all of those sources. We propose to follow up with multi-epoch monitoring of these jets, along with other observations detailed in the text. This completes VLBA monitoring of all accessible TeV HBLs, and will address a number of open questions about their physics, including placing constraints on the Lorentz and Doppler factors, and on the structure of the gamma-ray emitting region.
71254	RANSOM	GBT SEARCHES FOR RADIO MILLISECOND PULSARS IN FERMI UNASSOCIATED SOURCES	Fermi has revolutionized our understanding of the GeV sky as well as how we find radio millisecond pulsars (MSPs). In the past 5 years, radio astronomers and LAT team members have discovered 56 new MSPs (3/4 of them by our group and half at the GBT) in Fermi unassociated sources! The vast majority of these pulsars were discovered by the ``Pulsar Search Consortium''. We aim to continue this amazing pace of MSP discovery using the GBT. With five years of Fermi data, and many new LAT sources from the ``Pass 7'' analysis, there are scores of new high Galactic latitude unassociated sources to search. In addition, we will re-search ~25 bright and very pulsar-like sources in case eclipses or unfortunate scintillation hampered earlier searches. We request 50 hours of GBT time for this project.
71315	RUAN	ALL-SKY IDENTIFICATION OF FERMI BLAZARS BY INFRARED VARIABILITY: IN THE CATALOG AND BEYOND	Strong infrared flux variability in extragalactic objects is a clean signature of strongly-beamed jet emission, and can be used to identify gamma-ray blazar counterparts to the large number of unidentified Fermi LAT sources. We propose to use near-IR light curves from the WISE survey to systematically search for blazar counterparts to unidentified Fermi LAT sources in the 2FGL and our 48-month catalogs, and extend our search to the large population of fainter LAT sources detected down to 3-sigma significance. This will identify nearly all blazar counterparts to Fermi sources detected in these catalogs, and unveil a large population of hundreds of faint Fermi blazars lurking below the catalog detection threshold for the first time.
71199	SAZ PARKINSON	ENHANCED SEARCHES FOR GAMMA-RAY PULSARS IN THE GALACTIC CENTER	Understanding the nature of the gamma-ray emission from the Galactic Center (GC) region is both challenging and controversial. Claims of a possible dark matter origin have been widely reported. As a site of massive star formation, however, this region likely contains thousands of pulsars, but their radio detection is hampered by interstellar scattering, while gamma-ray detections are limited by low fluxes and high levels of diffuse emission. In December 2013, Fermi implemented a modified observing strategy, providing enhanced coverage of this region. We propose to capitalize on the increased LAT exposure, in conjunction with improvements in event reconstruction (Pass 8) to pursue a program of highly-sensitive blind searches for gamma-ray pulsars in this important and exciting region.

71104	SCHINZEL	A NEW POPULATION OF GAMMA-RAY EMITTERS AMONG FERMI-LAT UNASSOCIATED SOURCES	We aim to undertake a detailed examination of every Fermi detected object not identified with a known source type (e.g. blazar, pulsar). In 3FGL (4-years of data) a considerably large number of such sources remain, ~25% of the total. For every new unassociated 3FGL source we will use VLA/ATCA observations to probe for radio sources within the LAT error ellipse. We will follow up with VLBI observations using the determined radio positions to confirm identifications. This will increase the number of radio-gamma associations and will allow us to study the properties of "atypical" objects with peaked or steep spectrum radio counterparts. From our work on 2FGL we have found evidence for a new population of steady, radio-quiet gamma-ray sources that we expect to confirm as a new source class.
71277	SMITH	LONG TERM MULTI-WAVELENGTH OBSERVATIONS OF THE TEV BINARY LS I +61 303	We propose a multi-year, multi-wavelength study of the enigmatic GeV/TeV binary LS I +61 303 as part of joint VERITAS/Fermi observation program. The first part of this program will involve joint observaitons of LS +61 303 with Fermi-LAT, VERITAS, Swift-XRT, and optical monitoring (H-alpha, Ritter Observatory). These observations will allow for investigation of both the long term and short term variability and how these changes are linked to the alteration of the Be star wind outflow structure (H-alpha measurements). The second part of the study will involve a comprehensive, archival study of the existing data from radio to TeV emission, seeking to uncover the long term variations in the source and what unifying model of emission can explain this curious source.
71393	SPITKOVSKY	GAMMA-RAY PRODUCTION IN PULSAR CURRENT SHEETS	We will develop the model for gamma-ray emission from pulsars observed by Fermi. The model will be based on the 3D magnetospheric solutions which include the backreaction of currents on the structure of the field. Recent modeling indicates that the characteristic double-peak light curves can be explained by emission from the strong equatorial current sheet that separates field lines from the opposite hemispheres near the light cylinder. We will use resistive force-free and relativistic MHD models to provide the background field structure and plasma beaming required to calculate direction of emission. We will also calculate phase-resolved gamma ray spectra from dissipating current sheets obtained from kinetic simulations of the magnetosphere.

71257	TIBALDO	INTERSTELLAR GAMMA-RAY EMISSION FROM THE TANGENTS OF THE MILKY WAY SPIRAL ARMS	We propose to use Fermi LAT data to study the interstellar gas and cosmic rays at the tangents of spiral arms in the inner Milky Way. By measuring the gamma-ray emissivity per H atom from cosmic-ray interactions in these regions with well-defined locations, we will test the large-scale correlation of cosmic-ray densities with the distribution of their putative sources, supernova remnants and massive-star forming regions, and we will constrain propagation models. We will also directly compare the average cosmic-ray density with the star-formation rate for each region and probe for localized cosmic-ray enhancements. In addition, we will derive from the gamma-ray luminosity the CO-to-H2 conversion factor for well-located molecular clouds and investigate its variability across the Milky Way.
71387	VESTRAND	ENABLING OPTICAL OBSERVATIONS DURING THE FIRST MINUTES OF FERMI GAMMA-RAY BURSTS	We propose a new approach to the collection of optical observations during the first minutes of Fermi GBM-localized gamma-ray bursts. Our approach employs a wide-field imaging system, with a 500 sq-degree field-of-view, on a rapidly slewing telescope mount. This system will commence imaging within 5 seconds of the GBM alert, cover most of a typical GBM box, and provide a 3-sigma limiting magnitude of R~15 for 30-second exposures. The system will run proven real-time counterpart detection software capable of 10 arc-second localization to command follow-up with more powerful narrow-field instruments.
71209	VIANELLO	DETECTING HIGH-ENERGY GRBS AND PROBING THEIR TIME-DOMAIN PROPERTIES	Fermi has uncovered several unexpected properties of the high-energy emission from GRBs, which we summarized in the first LAT GRB catalog recently published. We propose to develop new algorithms for time series analysis of such transients. This will help to understand GRB jet physics, the underlying emission processes, and where particle acceleration occurs. We will also implement a new triggered search, which will increase up to 40% the number of detections, and a new blind search, aimed at detecting H.E. transients with no detected low-energy counterpart. This could open a new space for discovereries, including very high-redshift GRBs, high-energy emission from Pop-III stars, and orphan GeV afterglows. The close cooperation with GROND will ensure rapid follow-up of interesting cases.
71167	WOOD	FERMI LAT STUDIES OF THE 2014 PERIASTRON PASSAGE OF PSR B1259-63	We propose to analyze LAT data from the 2014 periastron in PSR B1259-63, tailoring analysis to the unique circumstances of this source. Key questions include whether gamma-ray flaring will recur and whether the gamma-ray light curve of the previous cycle will be replicated. New searches for pulsations will be conducted using selected Pass 8 data. Gamma-ray flaring will be compared with flares in the Crab and PSR J1023+0038. The analysis results will support a major multi-wavelength campaign for this periastron passage, comparable to that fielded in the previous cycle, and for which results have recently been published. Results will be used to test acceleration and emission models developed to explain the 2010-2011 gamma-ray activity.