The Symposium of Ultra-High-Energy Gamma Rays from Supernova Remnants and the Origin of Galactic Cosmic Rays

Report of Abstracts

https://indico.ihep.ac.cn/e/27978

Abstract ID : **1**

The Imprint of a Giant Magnetised Halo on Arriving Extragalactic Cosmic Rays

Content

A growing body of evidence indicates that Milky Way size galaxies are enshrouded in clouds of low density/high temperature gas, possessing a significant level of thermal pressure. These resuts warrant the consideration that this gas is also magnetised. The consequences of giant magnetised halos around galaxies are considered, with a focus on how this magnetic field can disclose its presence through its influences on penetrating extragalactic cosmic rays into the Galaxy.

Primary author: TAYLOR, Andrew (DESY)

Presenter: TAYLOR, Andrew (DESY)

Track Classification: Multi-wavelength observations of SNRs with UHE and VHE gamma rays

Contribution Type: Oral

Comments:

This talk is more focused on the nature of the Galactic halo, and would fit into a discussion on the transport of cosmic rays from their sources within the Galactic halo region. I realise that this talk topic doesn't fit into the "tracks" listed below, so I have randomly selected one of the "tracks".

Status: SUBMITTED

Submitted by **TAYLOR, Andrew** on **Wednesday, January 7, 2026**

Abstract ID : **2**

Supernova Remnants as the Main Sources of Galactic Cosmic Rays: Insights from Spectral Features

Content

Recent measurements reveal several features in the Galactic cosmic-ray (CR) spectrum. In particular, the proton and helium spectra exhibit a hardening at ≈300 GV and a steepening at ≈15 TV, followed by a knee-like feature at ≈3 PV. The spectra of heavier nuclei also harden at ≈300 GV, and the presence of a ≈15 TV softening has recently been confirmed by the DAMPE collaboration in the case of heavy primary nuclei. In addition, the B/C ratio shows a hardening at ≈100 GeV/n and appears relatively shallow at ≈1 TeV/n.

In this contribution, we discuss an interpretation of these spectral features within a composite diffusion scenario that includes different classes of sources. The model is based on two main assumptions. First, in the Galactic disk—where magnetic field lines are predominantly oriented along the plane—particle scattering is inefficient, so that CR transport from the disk to the halo is governed by magnetic field line random walk induced by large-scale turbulence. Second, supernova remnants (SNRs) supply the bulk of Galactic cosmic rays, while the observed spectral steepening at ≈15 TV reflects the typical maximum rigidity reached by the majority of these sources. Only a limited fraction of "special" accelerators—potentially including peculiar SNRs—are required to reach PeV energies and account for the CR population around the knee.

Within this framework, the observed spectra of primary and secondary nuclei can be consistently reproduced over a wide energy range, from GeV to PeV energies. We also discuss how this scenario can help reconcile the role of SNRs as the main sources of Galactic cosmic rays with the apparent difficulty of most remnants in accelerating particles up to PeV energies.

Primary authors: RECCHIA, Sarah (Institute of Nuclear Physics Polish Academy of Sciences, PL-31342 Krakow, Poland); GABICI, Stefano

Presenter: RECCHIA, Sarah (Institute of Nuclear Physics Polish Academy of Sciences, PL-31342 Krakow, Poland)

Track Classification: Theories of cosmic ray acceleration to the UHE regime

Contribution Type: Oral

Status: SUBMITTED

Submitted by **RECCHIA, Sarah** on **Friday, January 30, 2026**

Abstract ID : **3**

Cosmic Ray Transport in the Giant Milky Way Halo

Content

Recent observations revealed a substantial reservoir of gas in the circumgalactic medium (CGM), extending out to hundreds of kiloparsecs. This discovery has sparked growing interest in how cosmic rays(CR) propagate throughout the Galactic halo and the consequence of their interactions with this extended gas component. In this work, we investigate the possibility of diffusive CR transport in the extended Galactic halo and show the resulting differences from the traditional leaky-box and slab models. We find that when the halo size is sufficiently large(> 40 kpc), the results become insensitive to the halo size. Moreover, such large-halo models remain compatible with current observational constraints for reasonable values of the diffusion coefficient.

Primary authors: TAYLOR, Andrew (DESY); 李, 朝明 (南京大学天文与空间科学学院)

Presenter: 李, 朝明 (南京大学天文与空间科学学院)

Track Classification: Theories of cosmic ray acceleration to the UHE regime

Contribution Type: Oral

Status: SUBMITTED

Submitted by **李, 朝明** on **Tuesday, February 3, 2026**

Abstract ID : **4**

A Global Perspective on SNRs, MCs, and Gamma-ray Sources

Content

This report investigates the associations between supernova remnants (SNRs), pulsar wind nebulae (PWNe), and molecular clouds (MCs), and their role in TeV gamma-ray emission. Based on a systematic CO survey, we reveal that a high proportion (˜80%) of Galactic SNRs are associated with MCs. Separately, a statistical analysis of LHAASO TeV sources shows that PWNe and SNRs are major contributors, and that MC-associated PWNe show enhanced TeV emission with a systematic positional offset. Together, the studies establish that SNR/PWN-MC associations are prevalent in the Galaxy and are key environments for the production of very-high-energy radiation.

Primary author: ZHOU, Xin (Purple Mountain Observatory, CAS)

Presenter: ZHOU, Xin (Purple Mountain Observatory, CAS)

Track Classification: Multi-wavelength observations of SNRs with UHE and VHE gamma rays

Contribution Type: Oral

Status: SUBMITTED

Submitted by **ZHOU, Xin** on **Monday, February 9, 2026**

Abstract ID : **5**

Evidence of cosmic-ray acceleration up to sub-PeV energies in the supernova remnant IC 443

Content

Supernova remnants (SNRs) have been considered as the primary contributors to cosmic rays (CRs) in our Galaxy. However, the maximum energy of particles that can be accelerated by shocks of SNRs is uncertain, and SNRs' contribution to CRs around PeV energies is unclear. In this study, we present observations of high-energy γ-ray emission from the SNR IC 443 using the Large High Altitude Air Shower Observatory (LHAASO). The morphological analysis reveals a pointlike source whose location and spectrum are consistent with those of the Fermi-LAT-detected compact source with π^0-decay signature, and a more extended source that is associated with a newly discovered Fermi source. The spectrum of the point source can be described by a power-law function with an index of ~ 3.0, extending beyond ~ 30 TeV without apparent cutoff. Assuming a hadronic origin of the γ-ray emission, the 95% lower limit of accelerated protons reaches about 300 TeV. The extended source might be associated with IC 443, SNR G189.6+3.3 or the putative pulsar wind nebula CXOU J061705.3+222127, and can be explained by either a hadronic or a leptonic model with particles reaching hundreds of TeV. These LHAASO results provide compelling evidence that sub-PeV CRs can be accelerated efficiently by shocks of SNRs.

Primary authors: CHEN, Ensheng (IHEP); Dr GUO, Yingying; HUANG, Xiaoyuan (Purple Mountain Observatory, CAS); LIU, Siming (Southwest Jiaotong University); YUAN, Qiang (Purple Mountain Observatory); ZENG, Houdun (PMO); Mr ZHANG, Yi (PMO)

Presenter: CHEN, Ensheng (IHEP)

Track Classification: Gamma-ray observations of SNRs

Contribution Type: Oral

Status: SUBMITTED

Submitted by **Dr CHEN, Ensheng** on **Monday, February 9, 2026**

Abstract ID : **6**

Possible UHE Emission Stemming from the Vicinity of Pulsar Light Cylinder

Content

Fast spin velocity and strong strength of surface magnetic field of a pulsar result in helicity build up near the Y-point, the joint of last closed field lines with the current sheet; which invoke forced reconnection at the tip of the last closed field lines in the vicinity of the light cylinder. Such an intensive and rapid energy dissipation process has potetial to accelerate plasma to UHE level.

Primary author: 龚, 碧平 (华中科技大学)

Presenter: 龚, 碧平 (华中科技大学)

Track Classification: Theories of cosmic ray acceleration to the UHE regime; Multi-wavelength observations of SNRs with UHE and VHE gamma rays

Contribution Type: Oral

Status: SUBMITTED

Submitted by **龚, 碧平** on **Tuesday, February 10, 2026**

Abstract ID : **7**

Probing low-energy cosmic rays from SNR with MeV nuclear de-excitation lines

Content

Low-energy cosmic rays (LECRs) contribute substantially to the energy balance of the interstellar medium and play a significant role in the heating and chemistry of gas, which consequently impacts the star formation process. Despite the current difficulties of studying LECRs directly, in the near future, next-generation MeV telescopes will provide us with unique opportunities for indirect research of LECRs through MeV nuclear de-excitation lines that are produced via the interaction of LECRs and the interstellar medium. Here, we present results on the production of MeV de-excitation lines from different LECR sources, combining the numerical treatment of nuclear reactions using the code TALYS. We estimated the possible MeV lines from the assumed CR point source and SNRs, and investigated the possible detectability of MeV line emission from SNRs against the newly measured diffuse Galactic background in the MeV band, given the capability of the proposed MeV telescopes. Investigation of CR propagation in molecular clouds and feedback in star-forming regions via MeV nuclear de-excitation lines will also be discussed.

Primary author: LIU, Bing (University of Science and Technology of China)

Presenter: LIU, Bing (University of Science and Technology of China)

Track Classification: Gamma-ray observations of SNRs

Contribution Type: Oral

Status: SUBMITTED

Submitted by **LIU, Bing** on **Wednesday, February 11, 2026**

Abstract ID : **8**

Broadband spectrum of Cas A and its CR production

Content

I will present the radio to TeV broadband modeling to SNR Cas A, and discuss the implication of contribution of cosmic rays by supernova remnants.

Primary author: LI, Zhuo (Peking University)

Presenter: LI, Zhuo (Peking University)

Track Classification: Multi-wavelength observations of SNRs with UHE and VHE gamma rays

Contribution Type: Oral

Status: SUBMITTED

Submitted by **LI, Zhuo** on **Thursday, February 12, 2026**

Abstract ID : **9**

LHAASO Observations of Supernova Remnants G35.6-0.4 and CTB 87

Content

Supernova remnants (SNRs) are believed to be the primary sources of Galactic cosmic rays (CRs) up to the knee energy, making them promising candidates for ultra-high-energy (UHE, >100 TeV) gamma-ray emission. In this report, we present LHAASO's observations of two middle-aged SNRs, G35.6-0.4 and CTB 87. For both remnants, a point-like source at UHE band is detected. Although gamma rays above 100 TeV were observed, it remains difficult to firmly associate these gamma rays with the SNRs based on detailed spectral energy distribution (SED) modeling. In the case of G35.6-0.4, the UHE gamma-ray emission may arise from protons accelerated by the adjacent H II region. For CTB 87, the gamma-ray emission detected by LHAASO is likely attributed to the pulsar wind nebula powered by PSR J2016-3711.

Primary author: Dr ZHANG, Xiao (Nanjing Normal University)

Presenter: Dr ZHANG, Xiao (Nanjing Normal University)

Track Classification: Gamma-ray observations of SNRs

Contribution Type: Oral

Status: SUBMITTED

Submitted by **Dr ZHANG, Xiao** on **Thursday, February 12, 2026**

Abstract ID : **10**

Tracing Magnetic Field Variation in SNRs: An X-ray and Radio Polarimetric Comparison

Content

How does the interaction between supernova shocks and the interstellar medium influence magnetic field amplification and turbulence? To address this, we used IXPE to observe the southwestern shell of SN 1006, revealing a high average X-ray polarization (21.6%) that varies spatially: peaking at 40% in the south but dropping below 27% in the west where the shell hits an interstellar cloud. This correlation between polarization and density proves that magnetic turbulence is environment-dependent and constrains the turbulence scale to ⊠0.1 pc. Furthermore, the contrast between radial X-ray fields and Galactic-parallel radio fields suggests that X-ray polarization uniquely probes freshly amplified magnetic fields in the immediate postshock region, whereas radio traces the broader, pre-existing ambient environment.

Primary author: ZHOU, Ping (N)

Presenter: ZHOU, Ping (N)

Track Classification: Multi-wavelength observations of SNRs with UHE and VHE gamma rays

Status: SUBMITTED

Submitted by **ZHOU, Ping** on **Thursday, February 12, 2026**

Abstract ID : **11**

Possible Origin of the Extended Gamma Rays Around SNR Kes 78

Content

Whether supernova remnants (SNRs) are among the Galactic PeVatrons is a key problem in understanding cosmic-ray acceleration. We find that SNR Kes 78, evolving in a dense interstellar medium, is likely associated with a high-energy LHAASO source, J1850-0004u, whose spectral energies extends beyond 100 TeV. Reanalyzing the data, we identify a new >5σ point source in addition to the catalog Gaussian source, with the Gaussian fully covering the SNR. We also identified a Fermi extended source overlapping this SNR.
A pulsar is present in this region; with a 2sigma X-ray excess, and we crudely estimated its spin-down power from to be ~1×10^{35}erg/s. In our simulation, this pulsar is energetically insufficient to power a halo model for the Gaussian source.
A new point source identified from the WCDA data lies near the sources separately reported by HESS and HAWC observations, and it is likely of the same origin. We attempted to model the emission using a PWN scenario, but this may require a younger pulsar to fully explain the radiation.
Given the molecular gas in the environment, the GeV and TeV gamma-ray emission may arise from the p-p hadronic interaction by the protons that have been accelerated by the SNR with the ambient molecular gas. If so, the LHAASO observation indicates that SNR Kes78 has been working as a PeVatron, with the nearby molecular gas echoing the PeV protons that it accelerated at a much earlier period but is diffusing in the surrounding.

Primary authors: 沈, 蕴之 (南京大学); ZHANG, Xiao (Nanjing Normal University); CHEN, Yang (Department of Astronomy, Nanjing University); 黄, 晨 (Nanjing University); WU, Hanrong (IHEP); WU SHA, UNKNOWN (高能所)

Presenter: 沈, 蕴之 (南京大学)

Track Classification: Gamma-ray observations of SNRs; Multi-wavelength observations of SNRs with UHE and VHE gamma rays

Contribution Type: Oral

Status: SUBMITTED

Submitted by **沈, 蕴之** on **Friday, February 13, 2026**

Abstract ID : **12**

The impact of in-source production of boron on the B/C ratio in cosmic rays.

Content

Current cosmic-ray (CR) measurements reveal anomalies in secondary species, notably a hardening of the B/C ratio at high energies that deviates from the standard Galactic propagation expectation: $B/C \propto E^{-\delta}$. This behavior may suggest an additional contribution of secondary CRs produced and accelerated near their sources.
We investigate the production of secondary boron in Type-Ia & Type-IIP supernova remnants (SNRs), focusing on spallation processes during the diffusive shock acceleration (DSA) of primary CRs. Secondaries generated within the source can participate in the same shock acceleration as primaries. We model the in-source production and the acceleration of secondaries under realistic CR self-generated turbulence. Our results show that boron produced and accelerated inside SNRs develops a hard B/C component up to TeV energies, at the level of $10^{-3} - 10^{-2}$ depending on source density and acceleration time. This in-source component can significantly contribute to the high-energy secondaries flux and may explain the observed flattening of the B/C ratio at TeV energies.

Primary authors: JIANG, Qiqi (Deutsches Elektronen-Synchrotron (DESY)); Prof. POHL, Martin (DESY, University of Potsdam); Dr BROSE, Robert (University of Potsdam)

Presenter: JIANG, Qiqi (Deutsches Elektronen-Synchrotron (DESY))

Track Classification: Theories of cosmic ray acceleration to the UHE regime

Contribution Type: Oral

Status: SUBMITTED

Submitted by **JIANG, Qiqi** on **Friday, February 13, 2026**

Abstract ID : **39**

LHAASO Unveils PeVatron Twins in the G106.3+2.7 Region

Content

G106.3+2.7 is a puzzling SNR-PWN complex, consisting of an elongated supernova remnant and the Boomerang Nebula which is powered by the pulsar PSR J2229+6114. It is among the brightest ultrahigh-energy (UHE, photon energy E ≥ 100 TeV) gamma-ray emitting regions identified in recent years. In this paper, we report 3–1000 TeV gamma-ray emission from the G106.3+2.7 region observed by LHAASO. The gamma-ray emission in this region is resolved into three components: a point-like source spatially correlated with the Boomerang Nebula showing no clear spectral cutoff, a marginally extended component associated with a compact molecular cloud exhibiting a spectral cutoff at 73 TeV, and an significantly extended component lies beyond the SNR’s radio boundary showing a spectral cutoff at 205 TeV. The observations demonstrate that both SNR G106.3+2.7 and the Boomerang Nebula, which may be born from the same supernova explosion, could act as PeV particle accelerators.

Primary author: WU , Sha (高能所)

Presenter: WU , Sha (高能所)

Track Classification: Gamma-ray observations of SNRs

Contribution Type: Oral

Status: SUBMITTED

Submitted by **WU SHA, UNKNOWN** on **Saturday, February 14, 2026**

Abstract ID : **40**

Radio observations of supernova remnants

Content

Radio observations help identify supernova remnants (SNRs) and reveal information of magnetic fields. In this talk, I will present recent observations of SNRs with single-dish telescopes such as FAST and interferometers such as ASKAP.

Primary author: Prof. SUN, Xiaohui (Yunnan University)

Co-authors: HAN, Jinlin (National Astronomical Observatories, CAS); GAO, Xuyang (National Astronomical Observatories, CAS)

Presenter: Prof. SUN, Xiaohui (Yunnan University)

Track Classification: Gamma-ray observations of SNRs; Multi-wavelength observations of SNRs with UHE and VHE gamma rays

Contribution Type: Oral

Status: SUBMITTED

Submitted by **孙, 晓辉** on **Saturday, February 14, 2026**

Abstract ID : **41**

Detection of Microquasars at ultra-high energies by LHAASO

Content

The origin of Ultra-High-Energy (UHE) cosmic rays in our galaxy is still a core question in astro-particle physics. It is believed that cosmic rays could be accelerated to PeV at least. However, there is still lack of direct evidences for acceleration of particles to such high energy . Benefiting from the excellent sensitivity of LHAASO at UHE range, gamma-rays with energy up/beyond PeV are detected around/from mircoquasar systems. In this talk, I will give a brief introduction for the progress in detection of UHE emission associated with microquasars by LHAASO.

Primary author: LI, Cong (高能所)

Presenter: LI, Cong (高能所)

Track Classification: Gamma-ray observations of SNRs

Status: SUBMITTED

Submitted by **LI, Cong** on **Saturday, February 14, 2026**

Abstract ID : **42**

LHAASO Observations of SNR G69.7+1.0

Content

SNR G69.7+1.0 is a shell-type supernova remnant (SNR) identified in the radio band. It is spatially coincident with the ultra-high-energy (UHE) gamma-ray source 1LHAASO J2002+3244u and the GeV source 4FGL J2002.3+3246. In the First LHAASO Catalog, 1LHAASO J2002+3244u is reported as a point-like source, with test statistics (TS) values of 74.0 from the Water Cherenkov Detector Array (WCDA) and 43.6 from the KM2A array. The Fermi-LAT collaboration identifies 4FGL J2002.3+3246—spatially consistent with the LHAASO source—as a potential counterpart associated with either a supernova remnant or a pulsar wind nebula (PWN).Here, we present an updated analysis of this SNR using 5 years LHAASO data, combined with multi-wavelength observations, to investigate its physical nature and implications.

Primary author: 席绍强, UNKNOWN

Presenter: 席绍强, UNKNOWN

Track Classification: Gamma-ray observations of SNRs; Multi-wavelength observations of SNRs with UHE and VHE gamma rays

Contribution Type: Oral

Status: SUBMITTED

Submitted by **席绍强, UNKNOWN** on **Sunday, February 15, 2026**

Abstract ID : **43**

Constraints on Hadronic Emission from Microquasars detected by LHAASO

Content

Recently, the Large High-Altitude Air Shower Observatory (LHAASO) collaboration reported ultra-high-energy gamma-rays from six microquasar systems. For five of these, the emission exceeds 100 TeV, making microquasars promising Galactic PeVatrons. In this work, we investigate whether gamma-rays around 100 TeV can originate from hadronic interactions of accelerated cosmic rays with the ambient medium and estimate the contribution of these sources to the CR proton knee. Two transport scenarios are considered: one in which particle transport around the source is dominated by advection, and another in which it is dominated by diffusion, with the diffusion coefficient reduced with respect to the Galactic value. In both scenarios, the diffusion coefficient matches the Galactic value at large distances from the source. We also explore two injection models: continuous cosmic-ray injection over the entire lifetime of the source, and intermittent injection during periodic outbursts. We find that in both advection and diffusion scenarios, hadrons alone cannot fully explain the observed emission, allowing us to place upper limits on the hadronic fraction of the flux. Finally, we estimate the contribution of these sources to the Galactic cosmic-ray spectrum; this quantity strongly depends on source age and injection history.

Primary author: Dr VECCHIOTTI, Vitoria

Presenter: Dr VECCHIOTTI, Vitoria

Track Classification: Theories of cosmic ray acceleration to the UHE regime

Contribution Type: Oral

Status: WITHDRAWN

Submitted by **LIU, Ruoyu** on **Sunday, February 15, 2026**

Abstract ID : **44**

Recent LHAASO Results on Cosmic-Ray Proton and Helium Spectra and Future Prospects

Content

I will present LHAASO’s high-precision measurements of the proton and helium spectra and the combined p+He spectrum, around the knee. These results enabled by LHAASO hybrid, multi-parameter air-shower observations with scintillator, muon, and wide–field-of-view Cherenkov detectors. We observe an unexpected spectral hardening below the knee and identify a new knee-like structure, features that suggest contributions from at least two source populations—such as supernova remnants and microquasars—to the proton and helium spectra. Analyses of the iron spectrum near the knee and the higher-energy extensions of the proton and helium spectra are in progress.

Primary author: ZHANG, Shoushan (Institute of High Energy Physics)

Presenter: ZHANG, Shoushan (Institute of High Energy Physics)

Track Classification: Theories of cosmic ray acceleration to the UHE regime; Multi-wavelength observations of SNRs with UHE and VHE gamma rays

Contribution Type: Oral

Status: SUBMITTED

Submitted by **ZHANG, Shoushan** on **Monday, February 16, 2026**

Abstract ID : **45**

LHAASO observation on W51C

Content

This talk will report the LHAASO observation on SNR W51C

Primary author: CHEN（陈）, songzhan（松战）(中科院高能物理研究所)

Presenter: CHEN（陈）, songzhan（松战）(中科院高能物理研究所)

Track Classification: Gamma-ray observations of SNRs

Status: SUBMITTED

Submitted by **CHEN（陈）, songzhan（松战）** on **Monday, February 16, 2026**

Abstract ID : **46**

Particle escape from SNRs

Content

Since its discovery more than hundred years ago, the origin of the cosmic-ray (CR) flux measured on Earth is still unknown. To explain the energy region up the knee, located at few PeV, supernova remnants (SNRs) have been usually addressed as main CR accelerators. Despite experimental efforts devoted to the identification of PeV activity in SNRs through radiative signatures at the highest energies, such a picture remains yet to be confirmed. In this talk, I will discuss the physical mechanism of particle escape in connection to the acceleration, propagation, and radiation, particularly delving into its impact in shaping the spectrum of confined particles as well as that injected into the CR sea.

Primary author: SILVIA, Celli (Sapienza Università di Roma)

Presenter: SILVIA, Celli (Sapienza Università di Roma)

Track Classification: Gamma-ray observations of SNRs; Theories of cosmic ray acceleration to the UHE regime; Multi-wavelength observations of SNRs with UHE and VHE gamma rays

Contribution Type: Oral

Status: SUBMITTED

Submitted by **SILVIA, Celli** on **Monday, February 16, 2026**

Abstract ID : **47**

LHAASO observations of very-high-energy gamma-rays from SNR W44

Content

Establishing Supernova Remnants (SNRs) as Galactic cosmic ray sources requires evidence of particle escape. We report LHAASO observations of gamma-rays up to $\sim$ 100 TeV near the middle-aged SNR W44, consistent with escaping hadronic cosmic rays accelerated in an earlier epoch. These results confirm that middle-aged SNRs inject particles exceeding 100 TeV into the interstellar medium, supporting their role in generating the Galactic cosmic ray flux up to the knee.

Primary authors: Prof. WU, Hanrong; ZHANG, Bing Theodore; Prof. SU , Yang; Prof. ZHA, Min

Presenter: ZHANG, Bing Theodore

Track Classification: Gamma-ray observations of SNRs

Contribution Type: Oral

Status: SUBMITTED

Submitted by **ZHANG, Bing Theodore** on **Monday, February 16, 2026**

Abstract ID : **48**

Selected Results of MAGIC Measurements of SNR and CR

Content

This presentation introduces selected results from measurements of supernova remnants and cosmic rays performed with the two imaging atmospheric Cherenkov telescopes of the 17-meter diameter MAGIC system. The two telescopes, equipped with f/1 optics, are set 85 meters apart. A key feature of these telescopes is their nanosecond-speed electro-optical design, which enables measurements down to the energy threshold of approximately 20 GeV. MAGIC is located at the European Northern Observatory Roque de los Muchachos on the Canary Island of La Palma at an altitude of 2200 meters. Thanks to the development of a technique for very large zenith angle observations, the telescope can successfully and in a relatively short time measure sources up to the energy range of 100 TeV. A special calibration method has enabled observations up to a zenith angle of 75°. These properties allow us to perform sensitive measurements in the galactic center region, visible above 58° zenith angle. Also, these allow us to extend the spectral measurements of PeVatron candidate sources like, for example, the Crab Nebula and the supernova remnant G106.3+2.7. I will also mention our recent measurements of the cosmic proton spectrum, which extends up to an energy of ˜500 TeV.

Primary author: MIRZOYAN, Razmik (Max-Planck-Institute fro Physics)

Presenter: MIRZOYAN, Razmik (Max-Planck-Institute fro Physics)

Track Classification: Gamma-ray observations of SNRs

Contribution Type: Oral

Status: SUBMITTED

Submitted by **ZHANG, Bing Theodore** on **Tuesday, February 17, 2026**

Abstract ID : **49**

SNRs at TeV energies with IACTs

Content

Very-high-energy (VHE) gamma-ray observations with imaging atmospheric Cherenkov telescopes (IACTs) provide a unique window into the physics of supernova remnants (SNRs). In particular, their arcminute angular resolution enables detailed morphological studies, allowing us to resolve shell structures and reveal spatial variations in particle acceleration and emission processes. Two populations of gamma-ray–bright SNRs are emerging: evolved remnants interacting with dense environments, and young, fast shocks dominated by non-thermal emission.
In this talk, I will summarize the current status of SNR studies with IACTs and discuss their implications for cosmic-ray acceleration up to the highest energies.

Primary author: DE ONA WILHELMI, Emma (DESY)

Presenter: DE ONA WILHELMI, Emma (DESY)

Track Classification: Gamma-ray observations of SNRs

Contribution Type: Oral

Status: SUBMITTED

Submitted by **ZHANG, Bing Theodore** on **Tuesday, February 17, 2026**

Abstract ID : **71**

PeVatrons with the ASTRI Mini-Array

Content

The ASTRI Mini-Array, an array of nine Cherenkov telescopes, is currently being integrated at the Teide Astronomical Observatory in Tenerife, Spain. Utilizing a Schwarzschild-Couder double-mirror optical system, the array achieves a wide field of view (approximately 10 degrees in diameter). This design provides excellent gamma-ray sensitivity and angular resolution in the multi-TeV energy range, extending up to about 200 TeV. These capabilities will significantly enhance our understanding of the multi-TeV sky.

The primary scientific objectives of the ASTRI Mini-Array are the detailed spectral and morphological study of PeVatron candidates and other ultra-high-energy sources.

Science operations are slated to begin in the summer of 2026. The initial four years will be dedicated to "Pillar science," operating as an experiment before gradually transitioning to an observatory model accessible to the broader scientific community.

Primary author: Prof. GIULIANI, Andrea

Presenter: Prof. GIULIANI, Andrea

Track Classification: Gamma-ray observations of SNRs

Contribution Type: Oral

Status: SUBMITTED

Submitted by **ZHANG, Bing Theodore** on **Friday, February 20, 2026**