

Dr. Donggeun Tak

donggeun.tak@gmail.com • donggeun-tak.github.io • +82 10-2622-1988
Gimpo, South Korea

Astrophysicist & Data Analyst

Research Interests: Multi-Messenger Astrophysics, High-Energy Astrophysics, Transient Science, and Statistical Methods in Astrophysics

Main Research Topics: Gamma-Ray Bursts, Kilonovae, and Dark Matter

Education

- 2014 – 2019 **University of Maryland, College park** – Maryland, United States
PhD in Physics
Thesis: Temporal and Spectral Evolutionary Features of Gamma-ray Bursts Detected by the *Fermi Gamma-Ray Space Telescope*
Advisor: Dr. Julie McEnery
- 2007 – 2013 **Sungkyunkwan University** – Seoul, South Korea
B.S. in Mechanical Engineering and Physics

Professional Experience

Research Experience

- Oct. 2024 – Present **Research Professor**, Seoul National University
Mentor: Prof. Myungshin Im (Seoul National University)
- Nov. 2022 – Sep. 2024 **Post-doctoral Researcher**, Seoul National University
Mentors: Dr. Z. Lucas Uhm (Korea Astronomy and Space Science Institute) and Prof. Myungshin Im (Seoul National University)
- Oct. 2020 – Oct. 2022 **Post-doctoral Fellow**, Deutsches Elektronen-Synchrotron (DESY), Zeuthen
Mentor: Dr. Elisa Pueschel (DESY in Zeuthen)
- Jan. 2020 – July 2020 **Research Associate**, NASA/Goddard Space Flight Center (GSFC)
Mentor: Dr. Elizabeth Hays (NASA/GSFC)
- Jun. 2016 – Dec. 2019 **Graduate Researcher**, NASA/GSFC
Mentor: Dr. Julie McEnery (NASA/GSFC)

Teaching Experience

- Oct. 2020 – **Co-supervisor**, DESY, Zeuthen
Oct. 2022 *Advise a PhD student, Chiara Giuri (Universität Potsdam)*
- Sep. 2014 – **Teaching Assistant**, University of Maryland, College park
May 2016 *List of classes: Electrodynamics, Light, Relativity & Modern Physics, General Physics II, Intermediate Electricity and Magnetism, Principles of Modern Physics, Mathematical Methods for Physics II*

Grants

- 2024 **Sejong Science Fellowship**, National Research Foundation of Korea
Funding Amount: KRW 100,000,000 per year for 5 (3+2) years

Awards and Honors

- 2022 **NASA Honor Award - Group Achievement Award**, NASA/GSFC
- 2019 **KSEA-KUSCO Scholarship**, Korean-American Scientists and Engineers Association
- 2016 **Leon A. Herreid Science Fellowship**, University of Maryland, College park
- 2015 **Ralph Myers & Friends of Physics Awards**, University of Maryland, College park
- 2014 **Dean's Fellowship**, University of Maryland, College park
- 2013 **General Alumni Association Award for Academic Excellence**, Sungkyunkwan University
- 2007 **Jang-Yeong-Sil Scholarship**, Sungkyunkwan University

Science Collaboration Memberships

- 2020 – Present **VERITAS collaboration**
- 2020 – Present **CTA collaboration**
- 2018 – Present **AMEGO-X collaboration**
- 2016 – Present **Fermi-LAT collaboration**

Service

- 2020 **Proposal Reviewer**: Cycle-13 Fermi Guest Investigator Program
- 2019 – Present **Journal Referee**: Astrophysical journal, Notices of the Royal Astronomical Society
- 2018 **Chair**, 9th KGSA-UMD symposium

- 2018 **Group representative**, NET program (KGSA-UMD) supported by KOFST
- 2018 **Local Organizing Committee**, 8th international Fermi symposium
- 2018 **Washington Metro Chapter Chair**, National Math and Science Competition organized by KSEA
- 2016 – 2017 **President**, UMD Korean Graduate Student Association (KGSA)

Publication List

For papers reporting a substantially new scientific result, the *Fermi* and *VERITAS* collaboration publishes with author lists in alphabetical order. The major contributor(s) of such papers are designated as the corresponding author(s). A full list of publications can be found in <https://orcid.org/0000-0002-9852-2469> or [ADS](#).

First/Corresponding/Second Author Publications

- 13 **Multiwavelength Afterglow Analysis of GRB 221009A: Unveiling the Evolution of a Cooling Break in a Wind-like Medium**
D. Tak, Z. L. Uhm, G. S. H. Paek et al.
2025, *The Astrophysical Journal*, 978, 29
- 12 **Impact of Ejecta Temperature and Mass on the Strength of Heavy Element Signatures in Kilonovae**
D. Tak, Z. L. Uhm, Gillanders, James H.
2024, *The Astrophysical Journal*, 967, 54
- 11 **Indirect search for dark matter with a combined analysis of dwarf spheroidal galaxies from VERITAS**
D. Tak, VERITAS collaboration
2024, *Physical Review D*, 963, 063034
- 10 **Evidence of High-latitude Emission in the Prompt Phase of GRBs: How Far from the Central Engine are the GRBs Produced?**
Z. L. Uhm, D. Tak, B. Zhang et al.
2024, *The Astrophysical Journal Letters*, 110, 30
- 9 **Exploring the Impact of the Ejecta Velocity Profile on the Evolution of Kilonova: Diversity of the Kilonova Lightcurves**
D. Tak, Z. L. Uhm, Gillanders, James H.
2023, *The Astrophysical Journal*, 958, 121.
- 8 **Temporal and Spectral Evolution of Gamma-Ray Burst Broad Pulses: Identification of High-latitude Emission in the Prompt Emission**
D. Tak, Z. L. Uhm, J. Racusin et al.
2023, *The Astrophysical Journal*, 949, 110.
- 7 **Probing the multiwavelength emission scenario of GRB 190114C**
M. Klinger, D. Tak, A. M. Taylor, S. J. Zhu
2023, *Monthly Notices of the Royal Astronomical Society*, 520, 839.
- 6 **Search for Ultraheavy Dark Matter from Observations of Dwarf Spheroidal Galaxies with VERITAS**
D. Tak, VERITAS collaboration
2023, *The Astrophysical Journal*, 945, 101.

- 5 **Current and Future Gamma-Ray Searches for Dark Matter Annihilation Beyond the Unitarity Limit**
D. Tak, M. Baumgart, N. L. Rodd, E. Pueschel
2022, *The Astrophysical Journal Letter*, 938, 4.
- 4 **Fermi and Swift Observations of GRB 190114C: Tracing the Evolution of High-energy Emission from Prompt to Afterglow**
D. Tak, Fermi-LAT collaboration
2020, *The Astrophysical Journal*, 890, 9.
- 3 **Bright Gamma-Ray Flares Observed in GRB 131108A**
D. Tak, Fermi-LAT collaboration
2019, *The Astrophysical Journal Letters*, 886, 33.
- 2 **Closure Relations of Gamma-Ray Bursts in High Energy Emission**
D. Tak, N. Omodei, Z. L. Uhm
2019, *The Astrophysical Journal*, 883, 134.
- 1 **Multiple Components in the Broadband Gamma-Ray Emission of the Short GRB 160709A**
D. Tak, S. Sylvain, Z. L. Uhm
2019, *The Astrophysical Journal*, 876, 76.

Other Publications

- 27 **Periodic Gamma-Ray Modulation of the Blazar PG 1553+113 Confirmed by Fermi-LAT and Multiwavelength Observations.**
Fermi-LAT collaboration, including D. Tak
2024, *The Astrophysical Journal*, 976, 2
- 26 **Prospects for gamma-ray observations of the Perseus galaxy cluster with the Cherenkov Telescope Array.**
CTA collaboration, including D. Tak
2024, *Journal of Cosmology and Astroparticle Physics*, 2024, 10
- 25 **A Multiwavelength Study to Decipher the 2017 Flare of the Blazar OJ 287.**
VERITAS collaboration, including D. Tak
2024, *The Astrophysical Journal*, 973, 2
- 24 **Dark matter line searches with the Cherenkov Telescope Array.**
CTA collaboration, including D. Tak
2024, *Journal of Cosmology and Astroparticle Physics*, 2024, 7
- 23 **An Angular Diameter Measurement of β UMa via Stellar Intensity Interferometry with the VERITAS Observatory.**
VERITAS collaboration, including D. Tak
2024, *The Astrophysical Journal*, 966, 1

- 22 **A Multiwavelength Investigation of PSR J2229+6114 and its Pulsar Wind Nebula in the Radio, X-Ray, and Gamma-Ray Bands.**
Fermi-LAT collaboration, including **D. Tak**
2024, *The Astrophysical Journal*, 960, 1
- 21 **The Third Fermi Large Area Telescope Catalog of Gamma-Ray Pulsars.**
Fermi-LAT collaboration, including **D. Tak**
2023, *The Astrophysical Journal*, 958, 2
- 20 **A VERITAS/Breakthrough Listen Search for Optical Technosignatures.**
VERITAS collaboration, including **D. Tak**
2023, *The Astronomical Journal*, 166, 3
- 19 **VERITAS and Fermi-LAT Constraints on the Gamma-Ray Emission from Superluminous Supernovae SN2015bn and SN2017egm.**
VERITAS collaboration, including **D. Tak**
2023, *The Astrophysical Journal*, 945, 1
- 18 **Gamma-ray observations of MAXI J1820+070 during the 2018 outburst.**
VERITAS and many collaborations, including **D. Tak**
2022, *Monthly Notices of the Royal Astronomical Society*, 517, 4
- 17 **All-sky Medium Energy Gamma-ray Observatory eXplorer mission concept.**
AMEGO-X collaboration, including **D. Tak**
2022, *Journal of Astronomical Telescopes, Instruments, and Systems*, 8, None
- 16 **Improving the Low-energy Transient Sensitivity of AMEGO-X using Single-site Events.**
Martinez-Castellanos, I., Fleischhack, Henrike, Karwin, C., **D. Tak** et al.
2022, *The Astrophysical Journal*, 934, 2
- 15 **Search for New Cosmic-Ray Acceleration Sites within the 4FGL Catalog Galactic Plane Sources.**
Fermi-LAT collaboration, including **D. Tak**
2022, *The Astrophysical Journal*, 933, 2
- 14 **Incremental Fermi Large Area Telescope Fourth Source Catalog.**
Fermi-LAT collaboration, including **D. Tak**
2022, *The Astrophysical Journal Supplement Series*, 260, 2
- 13 **Multiresolution HEALPix Maps for Multiwavelength and Multimessenger Astronomy.**
Martinez-Castellanos, I., Singer, Leo P., Burns, E., **D. Tak** et al.
2022, *The Astronomical Journal*, 163, 6
- 12 **Observation of the Gamma-Ray Binary HESS J0632+057 with the H.E.S.S., MAGIC, and VERITAS Telescopes.**
VERITAS and many collaborations, including **D. Tak**
2021, *The Astrophysical Journal*, 923, 2

- 11 **Gamma Rays from Fast Black-hole Winds.**
Fermi-LAT collaboration, including **D. Tak**
2021, *The Astrophysical Journal*, 921, 2
- 10 **Catalog of Long-term Transient Sources in the First 10 yr of Fermi-LAT Data.**
Fermi-LAT collaboration, including **D. Tak**
2021, *The Astrophysical Journal Supplement Series*, 256, 1
- 9 **High-energy emission from a magnetar giant flare in the Sculptor galaxy.**
Fermi-LAT collaboration, including **D. Tak**
2021, *Nature Astronomy*, 5, None
- 8 **First Fermi-LAT Solar Flare Catalog.**
Fermi-LAT collaboration, including **D. Tak**
2021, *The Astrophysical Journal Supplement Series*, 252, 2
- 7 **Fermi Large Area Telescope Fourth Source Catalog.**
Fermi-LAT collaboration, including **D. Tak**
2020, *The Astrophysical Journal Supplement Series*, 247, 1
- 6 **Observation of inverse Compton emission from a long γ -ray burst.**
MAGIC, Fermi-LAT, and many collaborations, including **D. Tak**
2019, *Nature*, 575, 7783
- 5 **A Decade of Gamma-Ray Bursts Observed by Fermi-LAT: The Second GRB Catalog.**
Fermi-LAT collaboration, including **D. Tak**
2019, *The Astrophysical Journal*, 878, 1
- 4 **Investigating the Nature of Late-time High-energy GRB Emission through Joint Fermi/Swift Observations.**
Fermi and Swift collaborations, including **D. Tak**
2018, *The Astrophysical Journal*, 863, 2
- 3 **Fermi-LAT Observations of LIGO/Virgo Event GW170817.**
Fermi-LAT collaboration, including **D. Tak**
2018, *The Astrophysical Journal*, 861, 2
- 2 **3FHL: The Third Catalog of Hard Fermi-LAT Sources.**
Fermi-LAT collaboration, including **D. Tak**
2017, *The Astrophysical Journal Supplement Series*, 232, 2
- 1 **Search for Extended Sources in the Galactic Plane Using Six Years of Fermi-Large Area Telescope Pass 8 Data above 10 GeV.**
Fermi-LAT collaboration, including **D. Tak**
2017, *The Astrophysical Journal*, 843, 2

Selected Talks and Presentations

Oral/Poster Presentations

- Poster **Multi-wavelength Afterglow Analysis of GRB 221009A: Unveiling the Evolution of a Cooling Break in a Wind-like Medium**, 2024 KSHEP Fall meeting, Ulsan, Nov. 2024.
- Oral **Multi-wavelength Afterglow Analysis of the extremely bright GRB 221009A**, 2024 KPS Fall meeting, Yeosu, Oct. 2024.
- Oral **Estimating the density profile of the kilonova AT2017gfo**, 2024 KAS Fall meeting, Gyeongpo, Oct. 2024.
- Poster **Multi-wavelength Afterglow Analysis of GRB 221009A: Unveiling the Evolution of a Cooling Break in a Wind-like Medium**, 11th Fermi symposium, College park, Sep. 2024.
- Oral **An indirect search for dark matter with a combined analysis of dwarf spheroidal galaxies from VERITAS**, IAU General Assembly 2024, Capetown, Aug. 2024.
- Oral **Impact of Ejecta Temperature and Mass on the Strength of Heavy Element Signature in Kilonova**, IAU General Assembly 2024, Capetown, Aug. 2024.
- Oral **An indirect search for dark matter with a combined analysis of dwarf spheroidal galaxies from VERITAS**, COSPAR 2024, Busan, July 2024.
- Oral **Multi-wavelength Afterglow Analysis of the extremely bright GRB 221009A**, COSPAR 2024, Busan, July 2024.
- Oral **Impact of Ejecta Temperature and Mass on the Strength of Heavy Element Signature in Kilonova**, COSPAR 2024, Busan, July 2024.
- Oral **Understanding the role of heavy elements in forming the kilonova spectrum and lightcurve.**, 2024 KPS Spring meeting, Daejeon, Apl. 2024.
- Oral **Elucidating the Physical Mechanism of Gamma-Ray Bursts with the Curvature Effect**, 2024 KAS Spring meeting, Yeosu, Apl. 2024.
- Oral **An indirect search for dark matter with a combined analysis of dwarf spheroidal galaxies from VERITAS**, TeVPa 2023, Naples, Italy, Sep. 2023.
- Invited **Fermi Gamma-ray Space Telescope Era**. 1st LHAASO Symposium, Chengdu, May 2023.
- Oral **Indirect dark matter search beyond the unitarity limit with VERITAS**, 2023 KPS Spring meeting, Daejeon, Apl. 2023.
- Oral **Multi-wavelength analysis on the early afterglow of the extremely bright GRB221009A**, 2023 KAS Spring meeting, Jeonju-si, Apl. 2023.
- Oral **Indirect ultra-heavy dark matter searches with the current and future VHE observatories**, Kashiwa symposium, Tokyo, Nov. 2022.

- Oral **Probing the multiwavelength emission scenario of GRB 190114C**, IAU 2022, Busan, Aug. 2022.
- Poster **Probing the multiwavelength emission scenario of GRB 190114C**. Gamma 2022, Barcelona, July 2022.
- Poster **Indirect Dark-Matter Searches in VHE Gamma Rays with Legacy VERITAS Dwarf Spheroidal Observations**. Gamma 2022, Barcelona, July 2022.
- Poster **TACH: Time domain Astrophysics Coordination Hub**. Gamma 2022, Barcelona, July 2022.
- Invited **Indirect Dark-Matter Searches in Very-High-Energy Gamma Rays with VERITAS**, 32th Rencontres de Blois, Blois, France, Oct. 2021.
- Oral **Gamma-ray Bursts with a Sensitive MeV Detector**, AMEGO, APS April Meeting, Washington DC, Apr. 2020.
- Oral **Bright γ -ray flares observed in GRB 131108A**. Nanjing GRB conference, Nanjing, China, May 2019.
- Oral **High-energy emission from Gamma-Ray Bursts: The 2nd Fermi-LAT GRB Catalog**, Nanjing, China, May 2019.
- Poster **Search for evidence of high latitude emission in GRB broad pulses**, 2018 Fermi International Symposium, Baltimore, Oct. 2018.
- Poster **Closure Relations of Gamma-ray Bursts in High-energy Emission**, 2018 Fermi International Symposium, Baltimore, Oct. 2018.
- Oral **How far from the central engine are the GRBs produced?**, 2018 Fermi International Symposium, Baltimore, Oct. 2018.
- Oral **Gamma-ray Burst Closure Relation in High-Energy Emission**, 2018 US-Korea Conference, New York, Aug. 2018.
- Poster **Thermal and Non-thermal Emission Study in GRB160709A**, 35th International Cosmic Ray Conference, Busan, South Korea, July 2017.

Selected Talks

- Understanding the role of heavy elements in forming the kilonova spectrum and lightcurve**, Woojeon workshop, Pyeongchang, South Korea, Nov. 2024.
- Invited **Electromagnetic signatures from binary mergers: from gamma-ray bursts to kilonova**, Cosmology in the Multi-Messenger Era, Seoul National University, Seoul, South Korea, Oct. 2024.
- What can we learn from kilonovae using 7DT?**, Cosmology in the Multi-Messenger Era, Hoam Faculty House, Seoul, South Korea, Oct. 2024.
- Invited **Electromagnetic signatures from binary mergers: from gamma-ray bursts to kilonova**, Cosmology in the Multi-Messenger Era, Chungnam National University, Daejeon, South Korea, Oct. 2024.

- Invited **Indirect dark matter search with a very-high-energy gamma-ray observatory, VERITAS**, Space and Cosmic-ray Physics Online Seminar, University of Maryland, College park, MD, USA, Sep. 2022.
- Invited **Indirect dark matter search with a very-high-energy gamma-ray observatory, VERITAS**, AP seminar, Zeuthen, Germany, Sep. 2022.
- Temporal and Spectral Evolutionary Features in Fermi-LAT GRBs**, Harnack-Haus GRB workshop, Berlin, Germany, Apl, 2022.
- Invited **Temporal and Spectral Evolutionary Features of Gamma-ray Bursts Detected By the Fermi Gamma-ray Space Telescope**, KASI Seminar, Daejeon, South Korea, Aug. 2020.
- Invited **Gamma-ray bursts - the most explosive electromagnetic events in the universe**, VWMRC2020 (via Zoom), May 2020.
- Invited **Gamma-ray bursts - the origin of the high-energy emission**, Science and Exploration Directorate Director's Seminar (NASA/GSFC), Greenbelt, MD, Apl. 2020.
- Invited **High-energy (>100 MeV) emission from gamma-ray bursts**. CRESST II retreat, Baltimore, MD, USA, Nov. 2019.
- Bright γ -ray flares observed in GRB 131108A**. Astroparticle Physics Lab meeting (NASA/GSFC), Greenbelt, MD, USA, Apl. 2019.

Public Talks

- Dark Matter: A Primer**, 2021 VeKNI regional symposium, Berlin, Germany, Nov. 2021.
- Introduction to Gamma-Ray Bursts**. 8th KGSA symposium, College park, MD, USA, Mar. 2017.

References

Dr. Julie McEnery, Senior Scientist

University of Maryland, College park & NASA/GSFC

jmcenery@umd.edu, +1 301-286-1632

Dr. Elisa Pueschel, Staff Scientist

Ruhr-Universität Bochum

elisa.pueschel@astro.ruhr-uni-bochum.de, +49 234-32-24546

Prof. Myungshin Im, Full Professor,

Seoul National University

myungshin.im@gmail.com, +82 02-880-6585