

# The **MERCURY NEWSLETTER**

by the Mercury Exploration Assessment Group (MExAG)



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## **MERCURY SCIENCE and EXPLORATION NEWS**

- MExAG is turning three years old in June! Several Steering Committee (SC) members will be rotating off the committee, which opens slots for:
  - **Vice-Chair**
  - **Geology Discipline Member**
  - **Magnetosphere Discipline Member**
  - **Early Career Member**
  - **International Early Career Member**


Descriptions of these positions and the application are [found at this link](#). Applications are due **19 May**.


New SC members will be announced in June and featured in the August newsletter.

- The NSF Geospace Environment Modeling (GEM) community has formed the “Comparative Planetary Magnetospheric Processes” focus group to foster collaboration between planetary magnetosphere communities. There will be sessions relevant to Mercury’s magnetosphere at annual GEM meetings.
- The Planetary Geologic Mapping (PGM) community is partnering with Geological Society of America to bring planetary maps to GSA 2023. This combined meeting will replace the annual PGM summer meeting.
- Mark your calendars for BepiColombo’s next flyby of Mercury on 20 June 2023!
- Congratulations to MExAG SC member Dr. Catherine L. Johnson for election into the U.S. National Academy of Sciences!


### **STAY IN THE LOOP**

 <https://www.lpi.usra.edu/mexag/>

 @ExploreMercury

 MExAG list-serv:

<https://www.lpi.usra.edu/mexag/iofi/>

 Community forum:

[mercury-planet-list@googlegroups.com](mailto:mercury-planet-list@googlegroups.com)

### **KEEP US IN THE LOOP**

Please send Mercury community announcements and calendar items for inclusion in our next quarterly newsletter to [mexag.sc@gmail.com](mailto:mexag.sc@gmail.com).

## MERCURY EARLY CAREER SPOTLIGHT



### Willi Exner

*Research Fellow*

European Space Agency, ESTEC, Noordwijk, Netherlands

<https://www.cosmos.esa.int/web/personal-profiles/willi-exner>

Willi conducts global modeling of Mercury's magnetosphere, exosphere, and their interaction with the solar wind. Focus is given on extreme solar win events and analysis of electric current systems.



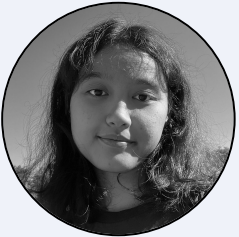
### Yichen Wang

*PhD Student*

Planetary Environmental and Astrobiological Research Laboratory, Sun Yet-sen University, China

<https://yichenwang9.github.io/>

Yichen uses reflectance spectra and images to study landforms (hollows and dark spots) formed by volatile-involved geological processes on Mercury.



### Rayta Pradata

*Undergraduate Student*

Bard College at Simon's Rock, MA, USA

Rayta compares observations of the solar wind at Mercury from MESSENGER data to simulated outputs from AWSoM model (University of Michigan), and addresses time distortions between the two time-dependent sequences.

If you would like to be highlighted in our Spotlight, or know of an Early Career Researcher focusing on Mercury science and/or exploration, please email us at [mexag.sc@gmail.com](mailto:mexag.sc@gmail.com).

## UPCOMING MEETINGS with MERCURY-RELATED CONTENT

### Culturally Inclusive Planetary Engagement

<https://www.lpi.usra.edu/planetary-reach/workshops/>

Workshops held throughout 2023.

The next is [8-10 June 2023 in New Orleans, LA, USA](#).

### GEM Workshop

<https://gemworkshop.org/>

11-16 June 2023

Hybrid: Virtual + San Diego, CA, USA

Registration open and [program available](#).

### AOGS2023

<https://www.asiaoceania.org/aogs2023>

30 July to 04 August 2023

Singapore

### DPS-EPSC2023 Joint Meeting

<https://aas.org/meetings/dps55>

1-6 October 2023

Hybrid: Virtual + San Antonio, TX, USA

### GSA 2023

Partnered with Planetary Geologic Mapping

<https://community.geosociety.org/gsa2023/home>

15-18 October 2023

Pittsburgh, PA, USA

### AGU Fall Meeting 2023

<https://www.agu.org/Fall-Meeting>

11-15 December 2023

Hybrid: Virtual + San Francisco, CA, USA

## RECENT MERCURY-RELATED PUBLICATIONS

View full list at <https://www.lpi.usra.edu/mexag/publications/>

### 2023 (as of May)

- Abbot, D. S., Hernandez, D. M., Hadden, S., Webber, R. J., Afentakis, G. P., & Weare, J., (2023), **Simple Physics and Integrators Accurately Reproduce Mercury Instability Statistics**, The Astrophysical Journal 944, 2. <https://doi.org/10.3847/1538-4357/acb6ff>.
- Alberti, T., Sun, W., Varsani, A., Heyner, D., Orsini, S., et al., (2023), **High-energy particle enhancements in the solar wind upstream Mercury during the first BepiColombo flyby: SERENA/PICAM and MPO-MAG observations**, Astronomy & Astrophysics 669. <https://doi.org/10.1051/0004-6361/202244662>.
- Barraud, O., Besse, S., & Doressoundiram, A., (2023), **Low sulfide concentration in Mercury's smooth plains inhibits hollows**, Science Advances 9, 12. <https://doi.org/10.1126/sciadv.add6452>.
- Bertone, S., et al., (2023), **Highly Resolved Topography and Illumination at Mercury's South Pole from MESSENGER MDIS NAC**, The Planetary Science Journal, 4, 21. <https://doi.org/10.3847/PSJ/acaddb>.
- Bott, N., Brunetto, R., Doressoundiram, A., Carli, C., Capaccioni, F., et al., (2023), **Effects of Temperature on Visible and Infrared Spectra of Mercury Minerals Analogues**, Minerals 13, 2. <https://doi.org/10.3390/min13020250>.
- Brown, G., & Hanno, R., (2023), **General relativistic precession and the long-term stability of the solar system**, Monthly Notices of the Royal Astronomical Society. <https://doi.org/10.1093/mnras/stad719>.
- Chambers, J., (2023), **Making the Solar System**, The Astrophysical Journal 944, 2. <https://doi.org/10.3847/1538-4357/aca96f>.
- Charbonnier, G., Boulila, S., Spangenberg, J. E., Vermeulen, J., & Galbrun, B., (2023), **Astrochronology of the Aptian stage and evidence for the chaotic orbital motion of Mercury**, Earth and Planetary Science Letters 610. <https://doi.org/10.1016/j.epsl.2023.118104>.
- Chaufray, J. -Y., Quémerais, E., Koutroumpa, D., Robidel, R., Leblanc, F., et al., (2023), **The EUV Reflectance of Mercury's Surface Measured by BepiColombo/PHEBUS**, Journal of Geophysical Research: Planets 128, 3. <https://doi.org/10.1029/2022JE007669>.
- Clement, M. S., Chambers, J. E., Kaib, N. A., Raymond, S. N., & Jackson, A. P., (2023), **Mercury's formation within the early instability scenario**, Icarus 394, 115445. <https://doi.org/10.1016/j.icarus.2023.115445>.
- Davis, E. E., Winslow, R. M., & Lawrence, D. J., (2023), **Characterizing Interplanetary Coronal Mass Ejection-related Forbush Decreases at Mercury Using MESSENGER Observations: Identification of a One- or Two-step Structure**, The Astrophysical Journal 943, 83. <https://doi.org/10.3847/1538-4357/acaca1>.
- Genova, A., Goossens, S., Del Vecchio, E., Petricca, F., Beuthe, M., Wiczorek, M., et al., (2023), **Regional variations of Mercury's crustal density and porosity from MESSENGER gravity data**, Icarus 391, 115332. <https://doi.org/10.1016/j.icarus.2022.115332>.
- Gläser, P., & Oberst, J., (2023), **Modeling the thermal environment of Mercury's north pole using MLA. Implications for locations of water ice**, Icarus 391, 115349. <https://doi.org/10.1016/j.icarus.2022.115349>.
- Glass, A. N., Tracy, P. J., Raines, J. M., Xianzhe, J., Norberto, R., & DiBraccio, G. A., (2023), **Characterization of Foreshock Plasma Populations at Mercury**, Journal of Geophysical Research: Space Physics 128, 2. <https://doi.org/10.1029/2022JA031111>.
- Griton, L., Issautier, K., Moncuquet, M., Pantellini, F., Kasaba, Y., & Kojima, H., (2023), **Electron density revealing the boundaries of Mercury's magnetosphere via serendipitous measurements by SORBET during BepiColombo first and second Mercury swing-bys**, Astronomy & Astrophysics

## RECENT MERCURY-RELATED PUBLICATIONS

670. <https://doi.org/10.1051/0004-6361/202245162>.  
Iacovino, K., McCubbin, F. M., Vander Kaaden, K. E., Clark, J., Wittmann, A., Jakubek, R. S., et al., (2023), **Carbon as a key driver of super-reduced explosive volcanism on Mercury: Evidence from graphite-melt smelting experiments**, *Earth and Planetary Science Letters* 602, 117908. <https://doi.org/10.1016/j.epsl.2022.117908>.
- Leblanc, F., Deborde, R., Tramontina, D., Bringa, E., Chaufray, J. Y., et al., (2023), **On the origins of backscattered solar wind energetic neutral hydrogen from the Moon and Mercury**, *Planetary and Space Science* 229. <https://doi.org/10.1016/j.pss.2023.105660>.
- Lézin, M., Amit, H., Terra-Nova, F., & Wardinski, I., (2023), **Mantle-driven north-south dichotomy in geomagnetic polar minima**, *Physics of the Earth and Planetary Interiors* 337. <https://doi.org/10.1016/j.pepi.2023.107000>.
- Morlok, A., Renggli, C., Charlier, B., Namur, O., Klemme, S., et al., (2023), **A mid-infrared study of synthetic glass and crystal mixtures analog to the geochemical terranes on mercury**, *Icarus* 396. <https://doi.org/10.1016/j.icarus.2023.115498>.
- Morrissey, L., Schaible, M., Tucker, O., Szabo, P., Bacon, G., et al., (2023), **Establishing a Best Practice for SDTrimSP Simulations of Solar Wind Ion Sputtering**, *The Planetary Science Journal* 4, 4. <https://doi.org/10.3847/PSJ/acc587>.
- Munaretto, G., Lucchetti, A., Pajola, M., Cremonese, G., & Massironi, M., (2023), **Assessing the spectrophotometric properties of Mercury's hollows through multiangular MESSENGER/MDIS observations**, *Icarus* 389, 115284. <https://doi.org/10.1016/j.icarus.2022.115284>.
- Mura, A., Plainaki, C., Milillo, A., Mangano, V., Alberti, T., Massetti, S., et al., (2023), **The yearly variability of the sodium exosphere of Mercury: A toy model**, *Icarus* 394, 115441. <https://doi.org/10.1016/j.icarus.2023.115441>.
- Pokorny, P., Deutsch, A.N., Kuchner, M. J., (2023), **Mercury's circumsolar dust ring as an imprint of a recent impact**, *The Planetary Science Journal* 4, 33. <https://doi.org/10.3847/PSJ/acb52e>.
- Saha, P., & Mukherjee, G. D., (2023), **Thermal conductivity of iron and nickel during melting: Implication to the planetary liquid outer core**, *Pramana* 97, 1. <https://doi.org/10.1007/s12043-022-02471-3>.
- Shao, P., Ma, Y., Odstroil, D., (2023), **Solar wind directional change triggering large-amplitude deflection of Mercury's current sheet**, *Astrophysics and Space Science* 368, 4. <https://doi.org/10.1007/s10509-023-04191-5>.
- Soni, S. L., Selvakumaran, R., & Thampi, R. S., (2023), **Assessment of the arrival signatures of the March 2012 CME-CME interaction event with respect to Mercury, Venus, Earth, STEREO-B, and Mars locations**, *Frontiers in Astronomy and Space Sciences* 9. <https://doi.org/10.3389/fspas.2022.1049906>.
- Teolis, B., Sarantos, M., Schorghofer, N. et al., (2023), **Surface Exospheric Interactions**, *Space Sci Rev* 219, 4. <https://doi.org/10.1007/s11214-023-00951-5>.
- Unterborn, C. T., Desch, S. J., Haldemann, J., Lorenzo, A., Schulze, J. G., et al., (2023), **The Nominal Ranges of Rocky Planet Masses, Radii, Surface Gravities, and Bulk Densities**, *The Astrophysical Journal* 944, 1. <https://doi.org/10.3847/1538-4357/acaa3b>.
- Zhong, J., Lee, L.-C., Slavin, J. A., Zhang, H., & Wei, Y., (2023), **MESSENGER Observations of Reconnection in Mercury's Magnetotail Under Strong IMF Forcing**, *Journal of Geophysical Research: Space Physics* 128, 2. <https://doi.org/10.1029/2022JA031134>.
- Zomerdijk-Russell, S., Masters, A., Korth, H., & Heyner, D. (2023), **Modeling the time-dependent magnetic fields that BepiColombo will use to probe down into Mercury's mantle**, *Geophysical Research Letters* 50, e2022GL101607. <https://doi.org/10.1029/2022GL101607>.

### Additional Mercury Publications?

Let us know! Send a note to [mexag.sc@gmail.com](mailto:mexag.sc@gmail.com) for inclusion in our quarterly newsletter.