

## Newsletter 20-35

Issue 20-35, July 27, 2020

+-----CONTENTS-----+

1. IN MEMORIAM: MICHAEL I. MISHCHENKO (1959-2020)
2. DPS ENVIRONMENTAL AFFAIRS SUBCOMMITTEE WHITE PAPER
3. FINAL REMINDER: VOTE IN THE DPS 2020 ELECTIONS
4. JWST CYCLE 1 GENERAL OBSERVER (GO) PROPOSAL DEADLINE
5. OUTER PLANETS ASSESSMENT GROUP (OPAG) VIRTUAL MEETING
6. FALL AGU VIRTUAL MEETING, ABSTRACT SUBMISSIONS OPEN

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### IN MEMORIAM: MICHAEL I. MISHCHENKO (1959-2020)

It is with great sadness that we announce the passing of our colleague Michael I.

Mishchenko. Dr. Michael Mishchenko was a graduate of the Moscow Institute of Physics and Technology and received his PhD (with honors) and Habilitation Doctoral degrees in physics from the National Academy of Sciences of Ukraine (NASU). He worked at the Main Astronomical Observatory in Kiev (1987-1992) and then joined the research staff of the NASA Goddard Institute for Space Studies in New York.

Michael's research interests included electromagnetic scattering by morphologically complex particles and particle groups, polarimetry, aerosol and cloud remote sensing, and ocean optics.

One of Michael's principal accomplishments was his development of efficient T-matrix methods to enable numerically exact computer calculations of scattering and absorption by complex dispersions of randomly and preferentially oriented atmospheric particulates.



T-matrix techniques are based on direct solutions of the Maxwell equations. The resulting computer programs work for morphologically complex particles with large size parameters, with benchmark accuracy over their range of applicability. Michael's T-matrix computer programs have been publicly available on-line since 1997, and have been used in more than 1450 peer-reviewed publications. Michael himself used T-matrix methods in pioneering studies of the effects of morphological particle complexities on the radiative, polarization, and depolarization properties of mineral aerosols, fractal-soot and soot-containing aerosols, soot-contaminated cloud droplets, contrail particles, and polar stratospheric and noctilucent clouds. Beyond scattering by single particles Michael derived the general theory of radiative transfer in particulate media directly from the Maxwell equations, an accomplishment that had eluded scientists for over a century. This microphysical derivation established the existence of a fundamental link between electromagnetics, radiative transfer, and coherent backscattering, defined the formal conditions of applicability of the radiative transfer equation, and clarified the physical nature of measurements taken with directional radiometers. It also identified and dispelled misconceptions inherent in conventional phenomenological radiometry and radiative transfer theory. As a result of Michael's work, the disciplines of radiative transfer and directional radiometry are now legitimate branches of physical optics.

While Michael was a consummate theoretician he also managed the NASA/GEWEX Global Aerosol Climatology Project developing an innovative algorithm to infer aerosol properties from multi-channel ISCCP radiance data and compiling the first global satellite climatology of aerosol optical thickness and size for the full period of satellite observations. Building on this work Michael's seminal sensitivity analysis of passive algorithms for the retrieval of aerosol properties from space using radiance and polarization data was instrumental in the development of the NASA Glory Space Mission for which Michael served as Project Scientist.

Dr. Mishchenko published 7 monographs, 23 peer-reviewed book chapters, and some 300 journal papers. He was Editor-in-Chief of the Journal of Quantitative Spectroscopy and Radiative Transfer and of Physics Open. He previously served as Topical Editor on scattering and meteorological optics for Applied Optics and was an editorial board member for several

other scholarly journals.

An elected Fellow of AGU, OSA, AMS, IoP (UK), and the Electromagnetics Academy, Dr. Mishchenko was the recipient of numerous professional awards including the AMS Henry G. Houghton Award, Hendrik C. van de Hulst Award from Elsevier, and two NASA Exceptional Scientific Achievement Medals. The International Astronomical Union honored Michael by giving Asteroid 22686 (1998 QL53) the name “Mishchenko”. Michael passed away on July 21, 2020. His loss and his legacy are enormous.

Andy Lacis, Larry Travis, Barbara Carlson, and Brian Cairns  
NASA GISS, 2880 Broadway, New York, NY 10025

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DPS ENVIRONMENTAL AFFAIRS SUBCOMMITTEE WHITE PAPER

The DPS Environmental Affairs Subcommittee (DPSEAS) has written a white paper “Pathways to Sustainable Planetary Science” to be submitted to the Decadal Survey.

Please have a look

[https://dps.aas.org/sites/dps.aas.org/files/decadal\\_survey/DPSEAS\\_White\\_Paper.pdf](https://dps.aas.org/sites/dps.aas.org/files/decadal_survey/DPSEAS_White_Paper.pdf) [1]

and considering endorsing at

<https://docs.google.com/forms/d/e/1FAIpQLSdxyIx4iOVHHmOIpYMMX0OOTIObgdOH8SRqjGI4k7mN-5wOHg/viewform> [2]

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FINAL REMINDER: VOTE IN THE 2020 DPS ELECTIONS

Thank you to those have already voted in the 2020 DPS Elections. As of today, 506 DPS Members have cast their ballots, a 41% turnout, matching last year’s record turnout!

We are very close to beating that record that this year!

Please vote today if you have not already done so as this is the FINAL WEEK to cast your ballot. The 2020 election for Vice-Chair and Committee closes this Friday, July 31, 2020.

We are electing the first-ever student representatives to the DPS Committee this year, so please take a moment to review the candidate statements and cast your vote. Thanks!

To vote you should have received an email from the AAS asking you to cast your ballot. Each email contains a link with a unique code that will bring you to the ballot site. There is no need to enter your AAS login information. You will be able to review the candidate statements and cast your vote.

You should vote for one of the two candidates for Vice-Chair:

- Diana Blaney
- Nader Haghighipour

The Vice-Chair will become the DPS Chair in October 2021.

You should vote for two of the four candidates for DPS Committee:

- Jessie Christiansen
- Edgard Rivera-Valentín
- Kelsi Singer
- Matt Tiscareno

The successful candidates will serve on the DPS Committee for three years.

You should vote for one of the two candidates for the student representatives to the

DPS Committee:

- Malena Rice

· Maya Yanez

The successful student candidate will serve on the DPS Committee for two years.

This information also appears on the election page when you click on the link in your email sent from the AAS.

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#### JWST CYCLE 1 GENERAL OBSERVER (GO) PROPOSAL DEADLINE

The major disruption caused by the COVID-19 pandemic continues to affect all of us. Integration and testing of the James Webb Space Telescope are among the activities impacted. NASA has re-evaluated the project schedule and announced a launch readiness date of October 31, 2021.

After consulting with the JWST Users Committee, STScI, NASA, ESA and CSA have finalized the review schedule for Cycle 1 proposals.

The JWST Cycle 1 General Observer (GO) proposal deadline will be 08:00 pm Eastern Time (ET) on Tuesday November 24, 2020.

We are announcing the deadline well in advance, so that proposers have flexibility to prepare proposals as their COVID-impacted schedules permit. The [Call for Proposals](#) [3] remains unchanged from its release earlier this year. All proposal tools and [documentation](#) [4] are available to proposers.

The JWST Telescope Allocation Committee (TAC) will review the proposals in February 2021 and recommend the Cycle 1 GO science program for announcement in March 2021. We send best wishes to our user community and their families in these challenging times. As always, please contact the [jwst helpdesk](#) [5] if you have any questions.

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## OUTER PLANETS ASSESSMENT GROUP (OPAG) VIRTUAL MEETING

The Outer Planets Assessment Group (OPAG) meeting will be held virtually

September 1–3, 2020. Each day, the meeting will run from 9:00 a.m. to 2:00 p.m. PDT (12:00 p.m. to 5:00 p.m. EDT).

The focus of this timely meeting will be on aspects of the decadal survey that are relevant to OPAG. Status reports will be requested from the Decadal Survey co-chairs and panel chairs.

### [Registration](#) [6]

Registration fees are not being collected for this virtual meeting, but registration is required. To continue receiving updates complete the [electronic registration form](#) [6].

Registered attendees will receive an e-mail prior to the workshop from Houston Meeting Info with virtual connection information.

<https://www.lpi.usra.edu/opag/> [7]

For more information, contact Meeting and Publication Services

USRA/Lunar and Planetary Institute [meetinginfo@hou.usra.edu](mailto:meetinginfo@hou.usra.edu) [8]

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## FALL AGU VIRTUAL MEETING, ABSTRACT SUBMISSIONS OPEN

The American Geophysical Union Fall Virtual Meeting 2020 abstract submission site is now open. Go to: <http://www.agu.org/Fall-Meeting> [9]

Abstract submission guidelines are at: <http://www.agu.org/Fall-Meeting/2020/Present/Abstracts> [10]  
Session Viewer/Abstract submission site is at: <http://agu.confex.com/agu/fm20/prelim.cgi/Home/0> [11]

We will be keeping all sites updated with information regarding the virtual meeting

as the planning continues.

#### AGU FALL MEETING SESSION: "ENCELADUS: A HABITABLE WORLD BECKONS"

Saturn's small yet active icy moon remains one of the most scientifically compelling worlds in the solar system.

In this long-running special session, now in its 15th year, we seek to sustain a highly multidisciplinary and stimulating atmosphere that enables a deeper understanding of the nature and causes of Enceladus' activity. We encourage submissions that specifically provide insights into the moon's interior, biological potential, surface morphology, south polar plume, and space environment from diverse disciplines: e.g., planetary geology, comparative planetology of relevant icy satellites, terrestrial studies, hydrothermal systems, oceanography, geodynamics, tectonics, volcanology, space physics, organic chemistry, geochemistry, astrobiology, origins of life, microbiology, and biosignatures. Field, laboratory, and theoretical studies are all welcome.

We also welcome contributions on Cassini data analysis and modeling, as well as instrument and mission concept developments that will lay the groundwork for a new generation of explorers to Enceladus.

Abstract submission deadline: July 29, 2020

Abstract submission link: <https://agu.confex.com/agu/fm20/prelim.cgi/Session/101707> [12]

Chris Glein (SwRI) and Bill McKinnon (WashU)

#### AGU FALL MEETING SESSION: P006 - CARBON ACROSS THE SOLAR SYSTEM ON THE EVE OF RETURNING ASTEROID SAMPLES

Studies of the existence and state of carbonaceous material on Solar System bodies

is at the forefront of planetary research. Samples of low-albedo asteroid 162173 Ryugu are en route to the Earth on the Hayabusa2 probe, and a rehearsal of the initial sample analysis is planned. At this time, the OSIRIS-REx space probe sampling of low-albedo asteroid 101955 Bennu has been rehearsed. As a framework for these studies, telescopic, laboratory and theoretical studies of carbon in all its forms have recently snowballed. The 2018 SSERVI Carbon in the Solar System workshop launched a series of presentations and discussions at various planetary science venues, enabling an information exchange around the weathering of carbonaceous compounds in response to thermal processes and irradiation, and what implications these compositions have for understanding material processing in the Solar System. We will generate and share ideas to support research and the imminent arrival of new samples.

We invite abstracts to be submitted through July 29:

<https://www.agu.org/Fall-Meeting/2020/Present/Abstracts> [13]

Conveners:

Faith Vilas (Planetary Science Institute)

Amanda R. Hendrix (Planetary Science Institute)

AGU FALL MEETING SESSION: “GEOLOGY AND GEOPHYSICS OF SATELLITES  
AND SMALL BODIES: TO IO, AND BEYOND”

We wish to invite abstracts to the AGU Fall Meeting Planetary Science session “Geology and Geophysics of Satellites and Small Bodies: to Io, and Beyond. This is an exciting time for exploring the dynamic, evolving small bodies in the Solar System. The AGU abstract submission site will open in late June. The deadline for all submissions is Wednesday, 29 July at 23:59 EDT. We hope to

see you (virtually!) in December.

Conveners: A.G. Davies, K. de Kleer, T. McCord, T. V. Johnson

This is a session of contributed and invited papers on the geology and geophysics of active or recently active satellites and dwarf planets, including small exoplanets. Research is progressing rapidly due to the stream of new spacecraft and Earth-based telescope data. Additionally, there are exciting future missions to the Jovian system under development, including Europa Clipper, JUICE, and the proposed Io Volcano Observer. Papers are welcomed on processes that affect the interiors of individual bodies as well as the surface expressions they produce. Included are the effects and chronology of internal heating (tidal dissipation and radioactivity), structural evolution (e.g., differentiation), tides, and other geophysical and geological processes (e.g., volcanism, tectonism).

Sincerely,

Ashley Gerard Davies, Katherine de Kleer, Tom McCord and Torrence Johnson.

#### AGU FALL MEETING SESSION “LOOKING AHEAD TO THE FUTURE OF PLANETARY SCIENCE”

We'd like to invite abstracts to the virtual AGU session “ Looking ahead to the future of Planetary Science” to be submitted through <https://www.agu.org/Fall-Meeting/2020/Present/Abstracts> [13] through July 29th, and look forward to seeing you for a fascinating session.

#### LOOKING AHEAD TO THE FUTURE OF PLANETARY SCIENCE

Description:

In preparation for the NASA Decadal Survey, the Planetary Science Division awarded

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funds to study eleven mission concepts under the rubric of PMCS (Planetary Mission Concept Studies). This program element solicited proposals for mission concept studies that addressed NASA's planetary science objectives, which are to ascertain the content, origin, and evolution of the Solar System and the potential for life elsewhere. The oral session will highlight the final reports of these Planetary Science Decadal Survey studies, while abstracts for additional concepts that the community may have will be solicited to be presented in a poster session.

Thanks a lot,

Doris Daou, Pat Beauchamp and Julie Castillo-Rogez

#### AGU FALL MEETING SESSION “THE FUTURE OF PLANETARY ATMOSPHERIC, SURFACE, AND INTERIOR SCIENCE USING RADIO AND LASER LINKS”

Radio science has been used to study solar system phenomena and fundamental physics for over five decades. The scope of this session includes radio and optical science techniques to study ocean worlds, planetary and small body interiors, the dynamics, composition, and thermal structure of planetary atmospheres, to characterize the scattering, electrical, and other properties of planetary surfaces, to study solar system dynamics, and to conduct tests in fundamental physics. Of particular interest are presentations on radio science investigations motivated by U.S. Planetary Science Decadal Survey white papers. Relevant technology topics include but are not limited to the design of small spacecraft networks and constellations, advances in flight and ground instrumentation, advances in space clock technologies, novel communications architectures including optical links, advances in radio and laser technologies, and new techniques and instrumentation for entry probe radio science.

The conveners invite abstracts to be submitted through July 29 at <https://www.agu.org/Fall-Meeting/2020/Present/Abstracts> [13]

David H. Atkinson, Sami W. Asmar, Luciano Iess, Silvia Tellmann

## AGU FALL MEETING SESSION "TITAN – PAST, PRESENT AND FUTURE INVESTIGATIONS OF SATURN'S GIANT MOON"

Titan's unique standing as the only moon in the solar system with a dense atmosphere provides an environment like no other. Its complex meteorology of rainfall, wind, rivers, lakes and seas interacting with a solid surface is reminiscent of the planets of the inner solar system, while its icy crust and deep liquid water interior provide comparison to outer solar system ocean worlds, such as Europa, Ganymede and Enceladus. Titan alone straddles these diverse environments, providing a fertile natural laboratory for studying one-of-a-kind chemistry, dynamics, geology and more. This session welcomes new results from past missions including Voyager and Cassini-Huygens; present day modeling, observations and experiments; and on-going scientific research to prepare for future missions including Dragonfly.

The conveners invite abstracts to be submitted through <https://www.agu.org/Fall-Meeting/2020/Present/Abstracts> [13] through July 29th, and look forward to a session filled with exciting new results.

Conor Nixon, Alex Hayes, Kathy Mandt and Christophe Sotin

## AGU FALL MEETING SESSION "CONCEPTS FOR FUTURE PLANETARY SCIENCE MISSIONS AND INSTRUMENTS" (E-LIGHTNING)

Today planetary science missions are exploring the solar system as never before. NASA spacecraft are headed to targets from Mercury to the Kuiper Belt, and aiming to return the first samples from Mars and asteroid Bennu. ESA spacecraft are reaching new targets from Mercury to Jupiter, and a wave of other missions from countries around the world are targeting the Moon, Mars, near-Earth asteroids and beyond, with an dizzying array of orbiters, rovers and landers. It is an exciting, dynamic time for planetary scientists with new opportunities to propose mission concepts ranging from small Cubesats to traditional large missions. This session solicits interactive electronic poster (e-Lightning) presentations on novel mission and instrument concepts designed for future planetary science missions.

Abstract submissions are encouraged on all relevant mission and instrument concepts at:  
<https://www.agu.org/Fall-Meeting/2020/Present/Abstracts> [13] by July 29th.

We look forward to another very interesting session in December.

Conor Nixon, Morgan Cable, Charles Hibbitts, Melissa Trainer

## AGU-2020 SESSION ON PLANETARY ACCRETION AND DIFFERENTIATION

We invite contributions to the session “Accretion and differentiation of rocky planets: perspectives from geophysics, geochemistry, & astronomy” at the [AGU Fall Meeting](#) [14]

from 7-11 December 2020, which will be at least partially virtual this year. We welcome contributions from all disciplines to advance the understanding of the formation and differentiation of rocky planets including, but not limited to, geochemistry, geophysics, cosmochemistry, planetary science, and astronomy:

<https://agu.confex.com/agu/fm20/prelim.cgi/Session/101356> [15]. The AGU

abstract portal is already open and the deadline for submissions is Wednesday, 29 July.

Session description: The simultaneous advent of high-resolution observations of planet-

forming disks and enhanced prospects to characterize rocky exoplanets highlights the need

for increasing interdisciplinary collaboration to understand the birth and life cycle of terrestrial worlds in our solar system and exoplanetary systems. Therefore, this session welcomes

abstracts that address new observational, theoretical, and laboratory constraints on the

formation of Earth and other terrestrial planets in the solar system as well as in exoplanetary systems. This includes modeling, observational, and experimental studies related to properties

of planetesimals, impacts, pebble accretion, core segregation, moon formation, crust-mantle differentiation, atmosphere formation, or other major geophysical/geochemical processes that fundamentally shape the evolution of rocky planetesimals and planets during their formation

and early evolution.

Conveners: Laura Schaefer (Stanford), Rebecca Fischer (Harvard), Tim Lichtenberg (Oxford)

Invited Speakers: Bethany Chidester (UC Davis), Jennifer Bergner (UChicago)

Sections: Study of Earth's Deep Interior (primary), Mineral and Rock Physics, Planetary Science

Themes: Origin and evolution, Planetary atmospheres, Planetary interiors, Planetary Geochemistry

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Send submissions to:

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Anne Verbiscer, DPS Secretary ([dpssec@aaas.org](mailto:dpssec@aaas.org) [16])

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online at <https://aas.org/about/policies/privacy-policy> [18]. Current and back

issues of the DPS Newsletter can be found at <https://dps.aas.org/newsletters> [19]

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## Footer

- [Reports](#)
- [Photos](#)
- [History](#)
- [Bylaws](#)
- [Giving](#)

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## Links

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[2] [https://urldefense.proofpoint.com/v2/url?u=https-3A\\_docs.google.com\\_forms\\_d\\_e\\_1FAIpQLSdxylx4iOVHHmOlPMMX0OQTIQbgdOH8SRqjGI4k7mN-2D5wOHg\\_viewform&amp;d=DwMGaQ&amp;c=ApwzowJNAKKw3xye91w7BE1XMRKi2LN9kiMk5Csz9Zk&amp;r=fG5pH1N7YtwOEF6xelPAeRse0ND3CGAXrgq3T4Wd0y4&amp;m=\\_5JQRmEI5KBjhv\\_N9zc252L24YvvoZ71xaFGjBguvbU&amp;s=sbWM58AG\\_wSVhRSfsaBtStQhX\\_ngaDS8PlJjhOOcro&amp;e=](https://urldefense.proofpoint.com/v2/url?u=https-3A_docs.google.com_forms_d_e_1FAIpQLSdxylx4iOVHHmOlPMMX0OQTIQbgdOH8SRqjGI4k7mN-2D5wOHg_viewform&amp;d=DwMGaQ&amp;c=ApwzowJNAKKw3xye91w7BE1XMRKi2LN9kiMk5Csz9Zk&amp;r=fG5pH1N7YtwOEF6xelPAeRse0ND3CGAXrgq3T4Wd0y4&amp;m=_5JQRmEI5KBjhv_N9zc252L24YvvoZ71xaFGjBguvbU&amp;s=sbWM58AG_wSVhRSfsaBtStQhX_ngaDS8PlJjhOOcro&amp;e=)

[3] [https://urldefense.proofpoint.com/v2/url?u=https-3A\\_jwst-2Ddocs.stsci.edu\\_jwst-2Dopportunities-2Dand-2Dpolicies\\_jwst-2Dcall-2Dfor-2Dproposals-2Dfor-2Dcycle-2D1&amp;d=DwMGaQ&amp;c=ApwzowJNAKKw3xye91w7BE1XMRKi2LN9kiMk5Csz9Zk&amp;r=fG5pH1N7YtwOEF6xelPAeRse0ND3CGAXrgq3T4Wd0y4&amp;m=\\_5JQRmEI5KBjhv\\_N9zc252L24YvvoZ71xaFGjBguvbU&amp;s=zdAiOtlwAzM6R3wGN-sDR-0TaCK97\\_N3Rglrv1j7Wwl&amp;e=](https://urldefense.proofpoint.com/v2/url?u=https-3A_jwst-2Ddocs.stsci.edu_jwst-2Dopportunities-2Dand-2Dpolicies_jwst-2Dcall-2Dfor-2Dproposals-2Dfor-2Dcycle-2D1&amp;d=DwMGaQ&amp;c=ApwzowJNAKKw3xye91w7BE1XMRKi2LN9kiMk5Csz9Zk&amp;r=fG5pH1N7YtwOEF6xelPAeRse0ND3CGAXrgq3T4Wd0y4&amp;m=_5JQRmEI5KBjhv_N9zc252L24YvvoZ71xaFGjBguvbU&amp;s=zdAiOtlwAzM6R3wGN-sDR-0TaCK97_N3Rglrv1j7Wwl&amp;e=)

[4] [https://urldefense.proofpoint.com/v2/url?u=https-3A\\_jwst-2Ddocs.stsci.edu\\_&amp;d=DwMGaQ&amp;c=ApwzowJNAKKw3xye91w7BE1XMRKi2LN9kiMk5Csz9Zk&amp;r=fG5pH1N7YtwOEF6xelPAeRse0ND3CGAXrgq3T4Wd0y4&amp;m=\\_5JQRmEI5KBjhv\\_N9zc252L24YvvoZ71xaFGjBguvbU&amp;s=s6xzBL-ShRCM6pJXp1wvKdqeXajeT9jtmsPYEEBZXHs&amp;e=](https://urldefense.proofpoint.com/v2/url?u=https-3A_jwst-2Ddocs.stsci.edu_&amp;d=DwMGaQ&amp;c=ApwzowJNAKKw3xye91w7BE1XMRKi2LN9kiMk5Csz9Zk&amp;r=fG5pH1N7YtwOEF6xelPAeRse0ND3CGAXrgq3T4Wd0y4&amp;m=_5JQRmEI5KBjhv_N9zc252L24YvvoZ71xaFGjBguvbU&amp;s=s6xzBL-ShRCM6pJXp1wvKdqeXajeT9jtmsPYEEBZXHs&amp;e=)

[5] [https://urldefense.proofpoint.com/v2/url?u=http-3A\\_jwsthelp.stsci.edu\\_&amp;d=DwMGaQ&amp;c=ApwzowJNAKKw3xye91w7BE1XMRKi2LN9kiMk5Csz9Zk&amp;r=fG5pH1N7YtwOEF6xelPAeRse0ND3CGAX](https://urldefense.proofpoint.com/v2/url?u=http-3A_jwsthelp.stsci.edu_&amp;d=DwMGaQ&amp;c=ApwzowJNAKKw3xye91w7BE1XMRKi2LN9kiMk5Csz9Zk&amp;r=fG5pH1N7YtwOEF6xelPAeRse0ND3CGAX)

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