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* ISWI Newsletter - Vol. 15 No. 005 19 May 2023 *
* Editor: George Maeda, georgemaeda3[at]gmail.com *
* Archive of back issues: ISWI Website https://iswi-secretariat.org/
* Archive of all ISWI webinars: *
* https://www.youtube.com/playlist?list=PLaOqa4cngOGF3cKuj6Yz5kqG1BQ-Akkhr
****

Reminder that the ISWI Website is cooking with gas again:
https://iswi-secretariat.org/

The new webmaster is:
Dr. Kathleen Kraemer
Boston College, Institute for Scientific Research
Kenny Cottle Hall
885 Centre St.
Newton, MA 02459, United States
E-mail: kathleen.kraemer[at]bc.edu

Please contact Kathleen directly for praise, errors,
suggestions, etc.

Another reminder:
If you have any time-sensitive announcements for
our ISWI community, please send to me as quickly as
you can. It should be two months ahead of the event.
This newsletter aims to go out each month on the 15th.

Note:
Attached PDF files are now labelled with a red 3-digit
serial number on the first page of each file.

-- Editor.

CONTENTS OF THIS ISSUE:

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[01]----------

>>>>>
Towards A Next-Generation e-Callisto Network (e-Callisto++)

Dear colleagues:

In recent private communications many of you have
mentioned that it would be a good idea to join efforts
in order to take the e-Callisto project to another level
and make its instruments and data more useful to the

scientific community.

I propose that we have a preliminary video-call soon (*).
Please express your interest in this initiative by filling
in this mini-questionnaire (3 short questions):
http://webs.um.es/bussons/NGCallisto++quest.docx
and returning your answers to:
javier.bussons[at]uah.es.

As an example, I have added my own answers (attached PDF).
We are considering sending a little communication for the
next CESRA workshop (Hertfordshire, UK, July 3-7).

Thank you,

Javier Bussons (Callisto-Spain, Universidad de Alcalá, UAH)
+ Christian Monstein

* Once we receive the questionnaires, we will set up a doodle.
  Depending on the number and location of participants, we might
  split the meeting in two sessions.

This PDF is attached:
NGCallisto++quest_BussonsSpain.pdf
001

>>>>>

[02]----------

ISWI Space Science School and AGS International Conference
in Zambia

See this PDF:
AGS_ISWI__Announcement.pdf
002

[03]----------

"(Hybrid format) United Nations Workshop on
the International Space Weather Initiative: The Way Forward"

Organised and hosted by
The United Nations Office for Outer Space Affairs

26 - 30 June 2023 -- Vienna

See this pdf:
PROGRAMME OUTLINE Vienna.pdf
003

A more detailed version will be provided next month in this newsletter.

[04]----------

.....9 May 2023

Dear ISWI participants,

The United Nations Office for Outer Space Affairs is pleased
to inform you that the recording of the eleventh webinar on the
International Space Weather Initiative,
Dr. Keith M. Groves - Small Scale Ionospheric Irregularities
(and their effects on radio wave propagation), which took place
on Wednesday, 26 April 2023, is now available on the YouTube
channel of the Office:
https://youtu.be/2ETfBKTWBKg

The current, as well as all previous ISWI webinar sessions
can be accessed through the website of the Office at:

https://www.unoosa.org/oosa/en/ourwork/psa/bssi/iswi_webinars.html

Best regards,

Patrick

[05]----------

FROM THE NEW YORK TIMES OF 17 APRIL 2023:
Satellites Threaten Astronomy, but a Few Scientists See an Opportunity

  "Mega-constellations built by SpaceX, Amazon and other companies could
   carry thousands of sensors that could aid research into gamma rays,
   space weather and other subjects."

The following is an excerpt from the article:

//
/The idea is not without precedent. In 2011, Iridium Communications
/worked with scientists to piggyback research instruments into space.
/Around 30 Iridium satellites - which typically beam voice and data
/communications down to Earth - also host dosimeters that measure
/radiation in low Earth orbit under the REACH program, a collaboration
/between the United States Air Force and scientists.
/
/And all of Iridium's 60-plus satellites carry magnetometers
/for the AMPERE program, run by the Johns Hopkins Applied Physics
/Laboratory, which studies how energy enters the Earth's ionosphere
/from its magnetosphere.
/
/Alexa Halford, an associate lab chief at NASA's Goddard Space Flight Center,
/says the Iridium readings are an important source of radiation data.
/Her work uncovers the connection between Earth's magnetosphere
/and its atmosphere and how the two work together to shield the
/ground from showers of strong radiation from space.
//

See this PDF:
Doing astronomy with satellites; the new york times.pdf
004

[06]----------

FROM THE NEW YORK TIMES OF 24 APRIL 2023
Northern Lights Are Seen in Places Where They Normally Aren't

The lights, driven by a large burst of energy from the sun, illuminated
an unusually wide area across North America and Europe and may be visible
again on Monday night.

See:
Northern lights.pdf
005

**********[End of this issue of the ISWI Newsletter]**********

QUESTIONNAIRE (A Next-Generation e-Callisto Network)

Goal: make e-Callisto instruments/data more useful to the scientific community.

My (Javier Bussons) answers in red.

1. PLEASE LIST YOUR GROUP'S WORK IN PROGRESS AND SHORT/MID-TERM PLANS:
This is interesting so as to avoid duplicities and foster bi-lateral or multi-lateral collaboration (future teams or work packages).
-Automatic SRB identification and classification by type based on Machine Learning
-Prompt alert system. Data Center. What products and for which community? SRB catalogue.
-Recently have started collaboration with LOFAR/Birr (Zucca), Humain, FHNW, ASSA/Learmonth.
-Antennas: leaky-wave proof of concept, tests with spider antennas, improvements on LPDAs
-Receiver: analog to SDR transition

2. WISH LIST FOR e-CALLISTO++ (regarding the instruments, the data or the services we provide; where would you do with "a little help from my friends"?):
- Observatory mode vs lone rider philosophy. Run the e-Callisto Collaboration as a single instrument (in fact Christian founded it as an "ISWI instrument") pretty much as the space missions or large ground-based networks (i.e. CTAO) do: science center, operations center, data center …
- Update our science case: new applications of our data may have arisen.
- Update instrumental status: recent developments in antennas, receivers, DAQ, analysis, products.
- Calibration in Solar Flux Units (SFU): both relative (e.g. with LOFAR data) and absolute (radio-frequency or wave-form generators).
- Coverage in geo-longitude: new stations needed?, where?
- Prompt alert system
- Autonomous (even more portable) stations or cells: RaspBerryPi instead of PC, solar panels vs plugged.

3. PLEASE LIST FORUMS WHERE YOU ARE OR WE SHOULD BE PRESENT AS A COLLABORATION (include funding agencies/actions, committees, calls for funds, grants; interesting meetings/workshops)
-Lately we've attended URSI-AT-AP-RASC (the Canaries, 2022), COSPAR (Athens, 2022), International Workshop on Machine Learning and Computer Vision in HelioPhysics (Sofia, last week).
-We plan to attend https://www.i4s-iberian-space-science-summer-school.com/ and the CESRA workshop this year.
-Just joined E-SWAN. Interested in WP5: Observational networks, infrastructure & data (ONID).
- COST actions. Capacity-building workshops.

ISWI Space Science School and African Geophysical Society International Conference

We are pleased to announce that the 2023 ISWI space weather school and the 6th African Geophysical Society (AGS) International Conference on **"Advancing Science & Technology in Developing Nations"** will take place at the Grand Palace Hotel, Lusaka, Zambia from September 26th to Wednesday, October 4th, 2023. The ISWI space weather school (September 26th – 30th) is open to MSc. and PhD students based at institutions mainly in Africa, while the AGS conference (October 2nd – 4th) is open to all interested participants. The ISWI school and AGS Conference will both be hosted by the Physics Society of Zambia in partnership with various local and international Partners including AGS, ISWI, University of Zambia, Copperbelt University, Nkrumah University, Mulungushi University, SCOSTEP/PRESTO, Catholic University of America, NASA, to name a few.

The scope of the AGS Conference will cover the following topics:

- Solar and Terrestrial (heliosphere, sun, solar wind, & MIT) studies
- Space weather effects on GNSS satellites and ground infrastructure
- Solid Earth and Atmospheric Sciences
- Earth and Space Science Informatics (ESSI)
- Science and Applications of GBAS/SBAS/EGNOS in Africa
- Science education and public outreach

Important Dates & deadlines:
Abstract submission opens: 1 May 2023
Abstract submission closes: 30 June 2023
Registration opens: 1 June 2023

website: https://afgps.org/conference

Support: Limited funding available for US-based postdocs and early career scientists. Need to submit an abstract.

Contact:
Dr. Chigo Ngwira
Co-Chair LOC/Science Organizing Committee
chigomezyo.ngwira@nasa.gov

003

(Hybrid format) United Nations Workshop on the International Space Weather Initiative: The Way Forward

Organised by

The United Nations Office for Outer Space Affairs

Hosted by

The United Nations Office for Outer Space Affairs

26 – 30 June 2023

Vienna

PROGRAMME OUTLINE

Venue: Vienna International Centre

Monday, 26 June	
Venue: Vienna International Centre (VIC) ***Time: Vienna time (UTC+1.00 hours)***	
	Registration
09:30	**Opening and Welcome Remarks**
09:30	Sharafat GADIMOVA, *United Nations Office for Outer Space Affairs*
09:40	Natchimuthukonar GOPALSWAMY, *National Aeronautics and Space Administration, United States of America*
	Keynote addresses: Setting the tone
09:50	Sun and Space Weather, *Natchimuthukonar GOPALSWAMY*, *National Aeronautics and Space Administration, United States of America*
10:10	Space Weather Campaigns*, Manuela TEMMER, Austria*
10:30 – 10:50	*Coffee Break*
10:50	**Session 1: Space Weather Instrumentation and Data**
13:10 – 14:10	*Lunch break*
14:10	**Session 2: Magnetosphere-Ionosphere-Thermosphere Coupling**
15:50 – 16:00	*Coffee Break*
16:00 – 17:30	**Discussion Panel 1: ISWI Instruments**
	Moderator: Shing FUNG, United States
17:30	*Adjourn*
Tuesday, 27 June	
09:00	**Session 3: Magnetosphere-Ionosphere-Thermosphere Coupling (continued)**
10:20 -10:40	*Coffee Break*
10:40	**Session 4: Space Weather Modelling**
13:00 – 14:00	*Lunch Break*
14:00	**Session 5: Space Weather Effects on Technology**
15:40 – 16:00	*Coffee Break*
16:00	**Session 6: Space Weather Research**
18:00	*Adjourn*
Wednesday, 28 June	
09:00	**Session 7: Space Weather Research (continued)**
10:40 -11:00	*Coffee Break*

11:00	**Session 8: National/Regional Space Weather Programs**
13:00 – 14:00	*Lunch Break*
14:00	**Session 9: Space Weather Case Studies**
15:40 – 16:00	*Coffee Break*
16:00 – 17:30	**Discussion Panel 2: ISWI – The Way Forward** *Moderator: Manuela TEMMER, Austria*
18:00	*Adjourn*
Thursday, 29 June	
	Technical Tour
Friday, 30 June	
09:00	**Session 8: Space Weather Case Studies**
10:40 -11:00	*Coffee Break*
11:00	**Session 9: Space Weather Case Studies (continued)**
12:20	**Wrap–up Session and Concluding Remarks** - Summary of sessions - Observations and recommendations
13:00	*Adjourn*

Satellites Threaten Astronomy, but a Few Scientists See an Opportunity

Mega-constellations built by SpaceX, Amazon and other companies could carry thousands of sensors that could aid research into gamma rays, space weather and other subjects.

An image of the double star Albireo in the constellation Cygnus taken in 2019 was marred by two of its ten 2.5-minute exposures recording Starlink satellites moving across the field.
*Credit...Rafael Schmall/NOIRLab/National Science Foundatio*n

By Lyndie Chiou
THE NEW YORK TIMES

April 17, 2023, 5:00 a.m. ET

Each night, the stars of the sky compete with thousands of satellites. The number of intruders is only growing as constellations of satellites proliferate, with companies planning to launch orbiters by the tens of thousands to transmit internet and other communications signals back to Earth. Among them are SpaceX, which has already launched thousands of Starlink satellites, and Amazon, which plans to begin its Project Kuiper constellation later this year.

For astronomers studying the universe from the surface of our world, this is a mounting problem.

“It’s a hot topic,” Eric Burns, an astronomer at Louisiana State University. “We’re dealing with numbers of satellites so great that they are limiting the sensitivity of ground-based telescopes.”

Many astronomers have lodged strong criticisms of the current and future effects of satellite constellations on their studies. But Dr. Burns and other scientists are thinking about making cosmic lemonade out of orbital lemons. What if, they ask, all those interfering satellites could help advance the field of astronomy as they expand access on the ground to satellite signals?

What these astronomers see is the potential for a new type of telescope that mega-constellations could provide. In a forthcoming proposal that Dr. Burns and his colleagues intend to share with private companies building satellite constellations, they hope that thousands of tiny gamma-ray detectors can hitch a ride into space with the satellites. Taken alone, each individual detector would be weak. But operating together inside a mega-constellation of many thousands of satellites, the power of such a system would rival Swift and Fermi, two gamma-ray observatories in space that are managed by NASA.

The impact would be significant. Gamma-ray bursts are the hallmark of the universe's most catastrophic events since the Big Bang. Deepening research into the phenomena could help answer today's grandest questions, such as what makes up the cores of neutron stars or how the behavior of dark energy could reveal the shape of the universe.

"These are about as important a set of questions as can be asked in astronomy," Dr. Burns said. "We will be able to treat the thousands of gamma-ray detectors as a single, extremely powerful coherent telescope looking all over the universe, which would be more sensitive than anything done before."

At work on the Swift gamma-ray observatory spacecraft in a clean room at Cape Canaveral in 2004.

Credit...KSC/NASA

The idea is not without precedent. In 2011, Iridium Communications worked with scientists to piggyback research instruments into space. Around 30 Iridium satellites — which typically beam voice and data communications down to Earth — also host dosimeters that measure radiation in low Earth orbit under the REACH program, a collaboration between the United States Air Force and scientists.

And all of Iridium's 60-plus satellites carry magnetometers for the AMPERE program, run by the Johns Hopkins Applied Physics Laboratory, which studies how energy enters the Earth's ionosphere from its magnetosphere.

Alexa Halford, an associate lab chief at NASA's Goddard Space Flight Center, says the Iridium readings are an important source of radiation data. Her work uncovers the connection between Earth's magnetosphere and its atmosphere and how the two work together to shield the ground from showers of strong radiation from space.

Dr. Halford said that the ways in which satellite mega-constellations interfere with telescopes on Earth's surface needed more consideration.

"Ground-based astronomy is incredibly important, and we need to be responsible," she said.

On the other hand, she sees great potential from putting scientific instruments on more satellites.

"More data can give us a more complete picture," Dr. Halford said. "I'd have a hard time saying no."

SpaceX is already sharing some data with scientists in an arrangement that could benefit both parties.

Tzu-Wei Fang, a scientist at the National Oceanic and Atmospheric Administration who specializes in predicting space weather, began collaborating with SpaceX after a disastrous launch in February 2022. SpaceX watched as 38 of its 49 newly deployed Starlink satellites burst into flames.

Dr. Fang's post-mortem documented how a minor geomagnetic storm had raised the density of the air at the altitudes where low-Earth orbits take place. So instead of sailing into orbit, the Starlink satellites smacked into dense, hot air and broke apart.

"No one can do low-Earth orbit drag very well right now because we don't have the right satellites," she said.

After that incident, SpaceX agreed to share the positioning and velocity data for its approximately 4,000 Starlink satellites for a year, giving Dr. Fang and her colleagues the opportunity to study the type of orbital drag that had destroyed the satellites. That could potentially lead to better space weather predictions, giving satellites more time to react to a surge in air density by rising to a safer orbital altitude, "which will ultimately benefit everybody," Dr. Fang said.

Getting scientifically useful data from satellite constellations presents technical hurdles. Satellites in low-Earth orbit move very fast, completing an entire orbital circuit in around 90 minutes. So combining data from a constellation of many satellites isn't easy.

And in order for scientific equipment to ride along into orbit, there are strict limitations. Low-Earth-orbit communications satellites, like SpaceX's Starlink, have short life spans of about five years, so the detectors would have to be inexpensive. By contrast, the Hubble Space Telescope cost around $16 billion in today's dollars but is expected to last around 40 years.

Any additions couldn't just be tacked on at the last minute. Satellite engineers would need to modify their designs to accommodate the new payloads with upgrades such as bigger power sources and data links.

None of the companies that are building enormous satellite constellations have said they would be willing to deploy gamma-ray detectors or other new sensors that would help scientists. When asked for comment on the idea, SpaceX declined to reply, and OneWeb, which recently completed another, smaller constellation, never responded. Project Kuiper, the constellation from the online retailer Amazon that may launch its first satellites later this year, said it had invited Dr. Burns to submit his proposal.

Dr. Halford suggested that increasing the number of partnerships with the constellation operators was a way to benefit everyone without cluttering the sky even further. "That's not a great answer, but I think it's the best we have," she said.

So far, the burden of individually negotiating with hesitant companies like SpaceX has frustrated astronomers. Dr. Burns thinks it might be time for government oversight to ensure minimal harm to science from mega-constellations.

With greater participation, Dr. Burns hopes scientists and satellite makers can learn to work together. "I do think this idea of science instruments on the mega-constellations themselves would be a benefit on both sides," he said. "If they're open to it, it's an even greater solution."

END

The New York Times | https://www.nytimes.com/2023/04/24/science/northern-lights-aurora-borealis.html

Northern Lights Are Seen in Places Where They Normally Aren't

The lights, driven by a large burst of energy from the sun, illuminated an unusually wide area across North America and Europe and may be visible again on Monday night.


By Livia Albeck-Ripka and Derrick Bryson Taylor

April 24, 2023 Updated 7:54 a.m. ET

The sky over an unusually wide swath of the northern hemisphere lit up with a brilliant display of color overnight into Monday morning, dazzling people across North America and Europe.

The display was potentially visible as far south as Iowa in the United States, as well as in parts of southern England, scientists said.

The phenomena, known as the aurora borealis or northern lights, occurs when particles emitted by the sun collide with particles that are already trapped around Earth's magnetic field, and can often be seen from parts of Iceland, Canada and Alaska.

But on Friday, the sun let off a large burst of energy, said Robert Steenburgh, a space scientist with the Space Weather Prediction Center at the National Oceanic and Atmospheric Administration. (These bursts are also known as coronal mass ejections.)

"The sun spit off a big blob of plasma," Mr. Steenburgh said. The burst of energy, which has its own magnetic field, had been moving through space and reached Earth's magnetic field on Sunday, when the two collided to create a geomagnetic storm, he said. "It got our magnetosphere pretty revved up."

When this happens, the aurora can be seen closer to the Equator, Mr. Steenburgh said. Such events are not that uncommon, with about 100 occurring every 11 years, he said, adding that the storm can also disturb high frequency radio used at sea and by airlines.

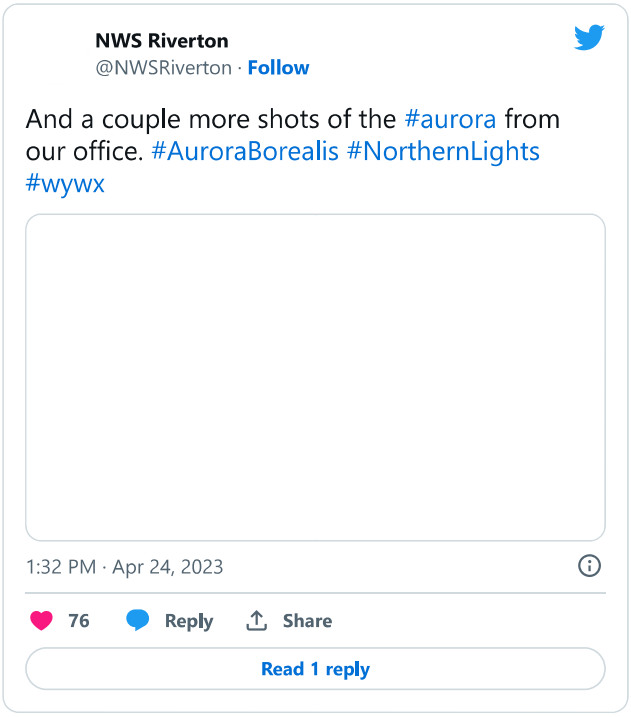
The aurora borealis was also visible over Whitley Bay, in northeastern England, on Monday. Owen Humphreys/PA Images, via Getty Images

For those unaccustomed to seeing the night sky illuminated by streaks of green or red, an aurora borealis — in folk tales, the northern lights have been associated with spirits and divine forces — can inspire awe, or even fear.

In 1872, an article in The New York Times described a sky glowing so intensely that "many persons supposed a great fire was raging back of Brooklyn." In 1941, hundreds of onlookers gathered on the boardwalk of Rockaway Beach, N.Y., to view the phenomena, and in 1929, many readers of The Times called the paper to report the dazzling sight.

On Sunday evening, forecasters in the United States said the geomagnetic storm was likely to cast an aurora that could be seen from some northern states like Maine and Michigan. Britain's national weather service, the Met Office, predicted that Scotland and northern England would be able to see the lights, with another chance to view them on Monday night into Tuesday.

On Sunday, the storm created a spectacular show of light.



Forecasters with the National Weather Service office in Riverton, Wyo., shared images of a sky painted with deep purples and bright greens. The northern lights were also seen over Maine, parts of Wisconsin, as well as in Toronto, in Canada.

In Europe, the northern lights were seen over southern England, where streaks of magenta and yellow illuminated the skies above Stonehenge.

Livia Albeck-Ripka is a reporter for The Times based in California. She was previously a reporter in the Australia bureau. @livia_ar

Derrick Bryson Taylor is a general assignment reporter. He previously worked at The New York Post's PageSix.com and Essence magazine.