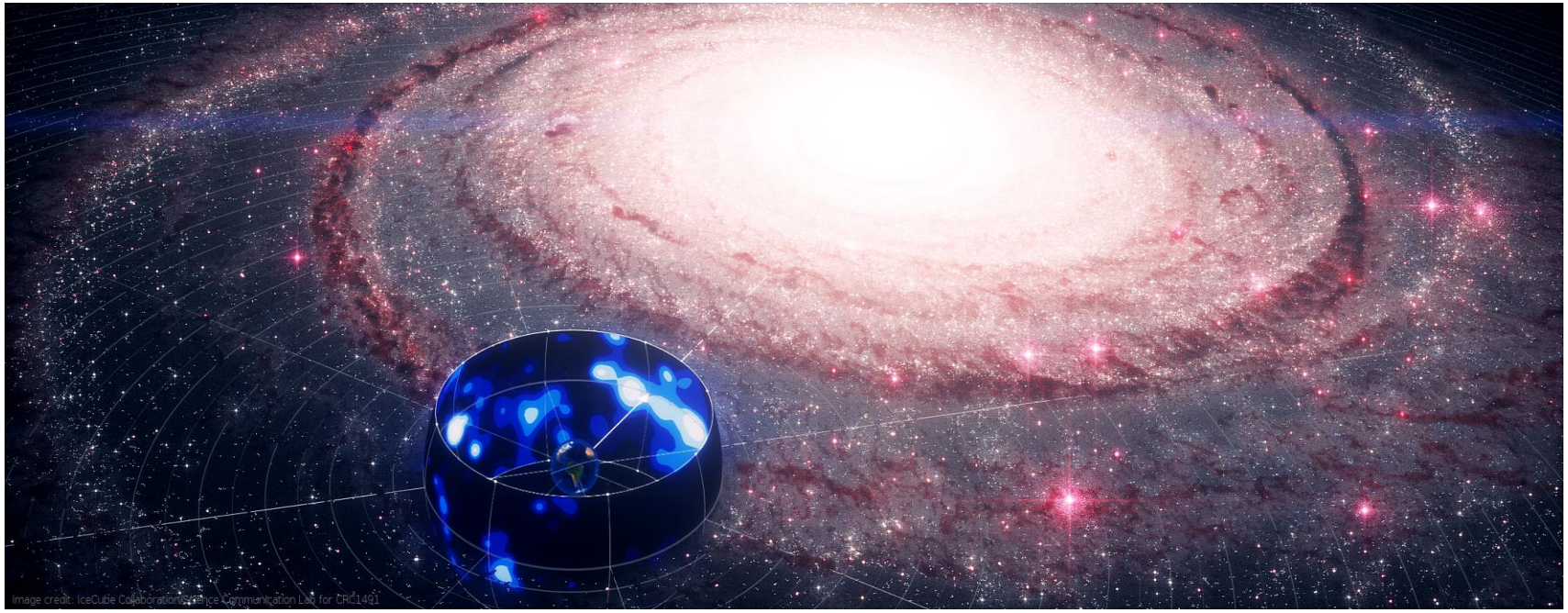
technische universität dortmund

IceCube SOUTH POLE NEUTRINO OBSERVATORY

SFB 876 Providing Information by Resource-Constrained Data Analysis

SFB1491



Announcing the detection of neutrino emission from the Galactic Plane

– A perspective from TU Dortmund University –

Mirco Hünnefeld
mirco.huennefeld@tu-dortmund.de

SPONSORED BY THE Federal Ministry of Education and Research

Funded by DFG Deutsche Forschungsgemeinschaft German Research Foundation

TAUP 2023, Wien
August 30th, 2023

Science – June 30, 2023

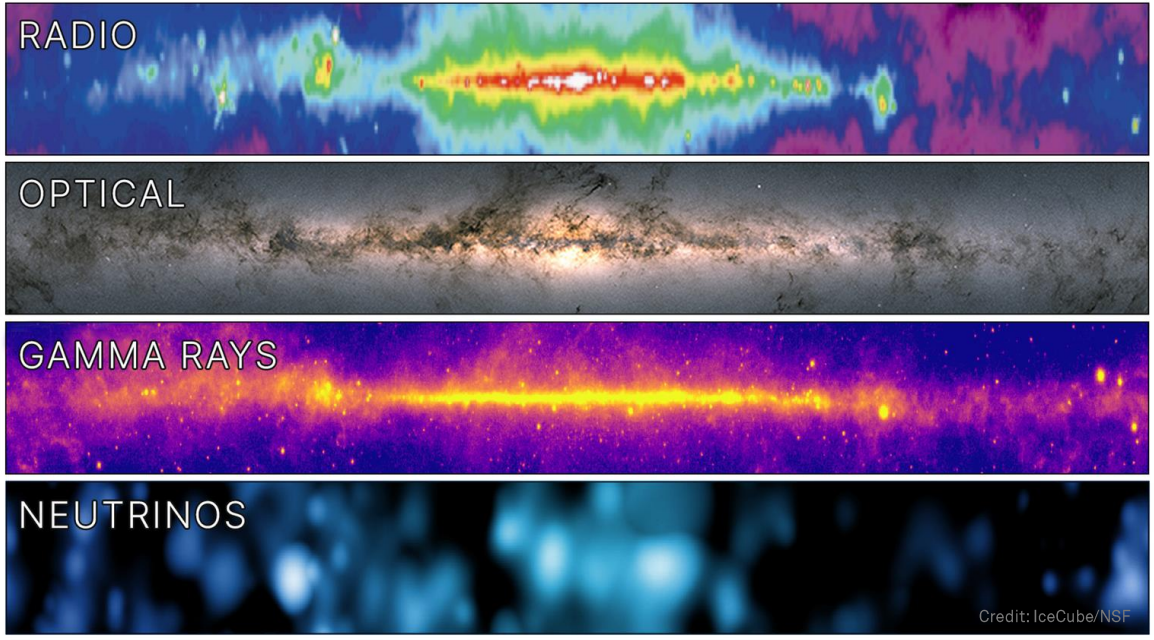
RESEARCH

RESEARCH ARTICLES

NEUTRINO ASTROPHYSICS

Observation of high-energy neutrinos from the Galactic plane

IceCube Collaboration*†



Talk Outline

Introduction: Neutrinos from the Galactic Plane

20th of January 2022: How it started

- Analysis Unblinding

Preparing the Announcement

- Overview and Challenges
- Organization of Webinar
- Creation of outreach content
- Social Media Campaign

29th of June 2023: Announcing the Results

- Webinar from Dortmund's Perspective

Media Impact and Reactions

Milky Way In Neutrino Light

“The Milky Way in Neutrino Light” on YouTube

Credit: IceCube Collaboration / Science Communication Lab for CRC1491

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20th of January 2022: how it started

Analysis Unblinding:

- Analysis is developed in a blinded fashion
- Once review and checks have been cleared, unblinding approval is granted
- This is the “moment of truth”


Stephen Sclafani


Mirco Hünnefeld


Michael Richman


Naoko Kurahashi Neilson

```
mhuennefeld@cobalt08:~
(venv) mhuennefeld@cobalt08 ~ $ python unblind.py unblind-gp --TRUTH pi0
```

```
============================================
=== Results for GP template: pi0
============================================
    Number of Background Trials: 549500000
    TS: 22.189
    ns: 748.043
    p-value: 1.261e-06
    n-sigma: 4.71
    --> Found evidence for a source!
============================================
```


sclafani 4:12 PM
@mrichman Approved for unblinding


mhuennefeld 5:16 PM
showtime 🙂 What zoom room are we using?

20th of January 2022: how it started

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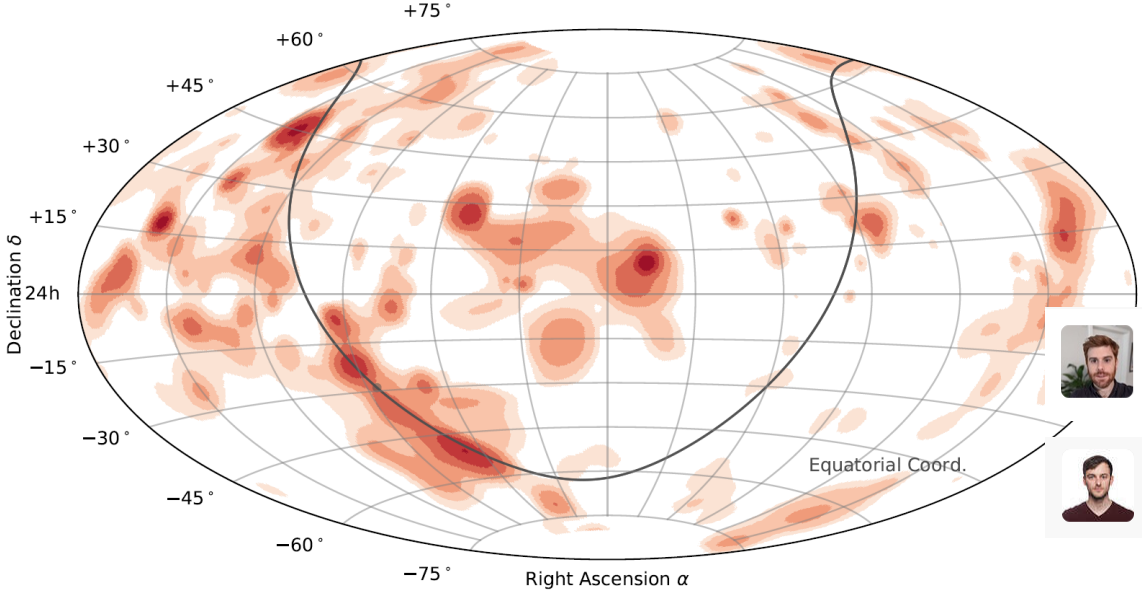

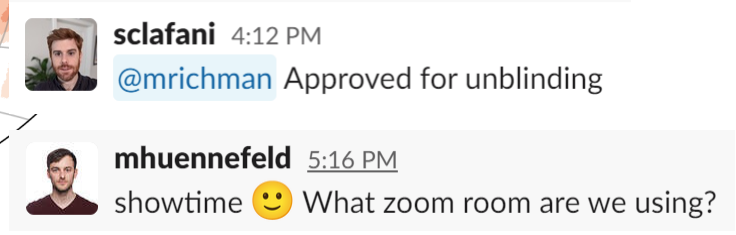

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IceCube South Pole Neutrino Observatory · SFB1491 · SFB 876 Providing Information by Resource-Constrained Data Analysis · Funded by DFG Deutsche Forschungsgemeinschaft German Research Foundation · Federal Ministry of Education and Research

Preparing the Announcement

Many moving parts:

- Paper publication
- Organization of webinar
- Preparation of outreach material
- Press package and press statements
- Social media campaign

Challenges:

- Technical challenges of joint webinar
- Many time zones involved
- Strict embargo policies
- Date of publication was unknown

RESEARCH

RESEARCH ARTICLES

NEUTRINO ASTROPHYSICS

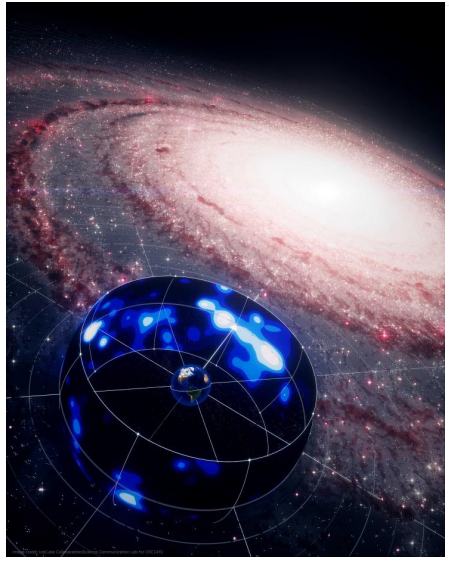
Observation of high-energy neutrinos from the Galactic plane

IceCube Collaboration*†

Credit: Felix Schmale

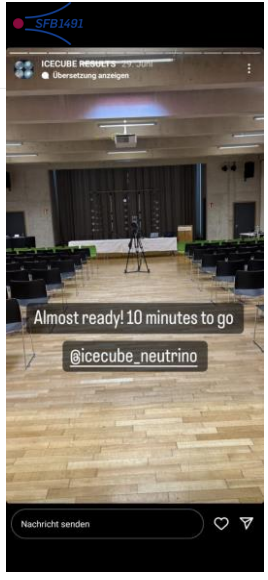
(idw) idw - Informationsdienst Wissenschaft
Nachrichten, Termine, Experten

The New York Times



Neutrinos Build a Ghostly Map of the Milky Way

Astronomers for the first time detected neutrinos that originated within our local galaxy using a new technique.



Preparing the Announcement: Webinar organization

Webinar content:

- Coordination of webinar content
- Preparation of slides
- Rehearsal talks

Technical challenges:

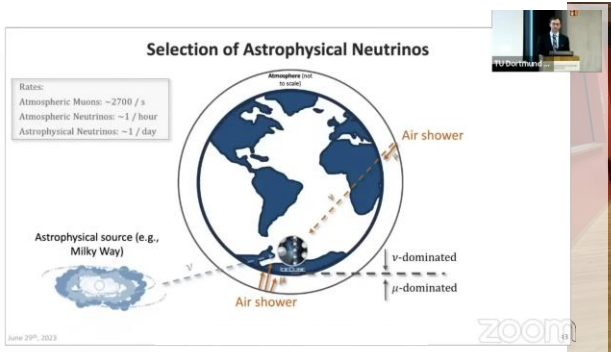
- Joint webinar at TU Dortmund and Drexel University
- In-person, plus streaming from both venues
- Rehearsal and coordination with external A/V-teams

Venue, Catering, Invitations:

- Flexible planning with backup options
- Invitations to institute, collaborations, funding agencies, politicians

Art Exhibition by Tim Otto Roth:

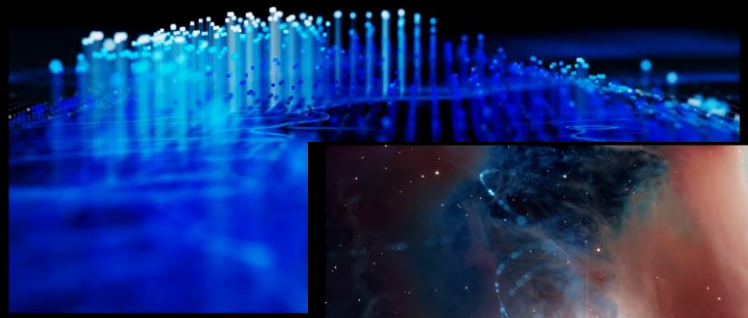
- Visualization of neutrino events

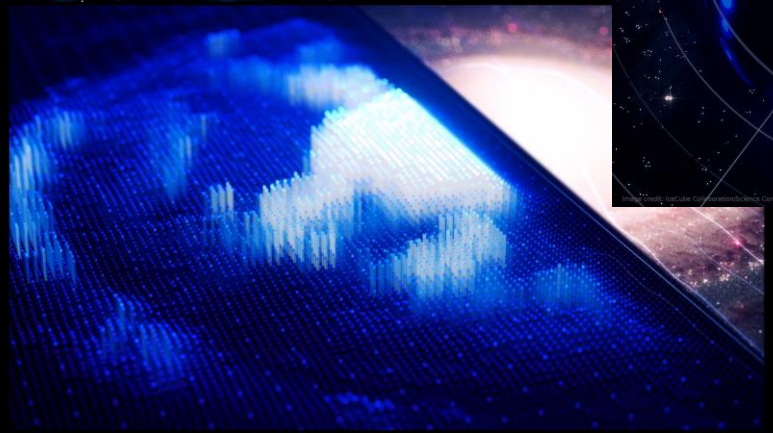


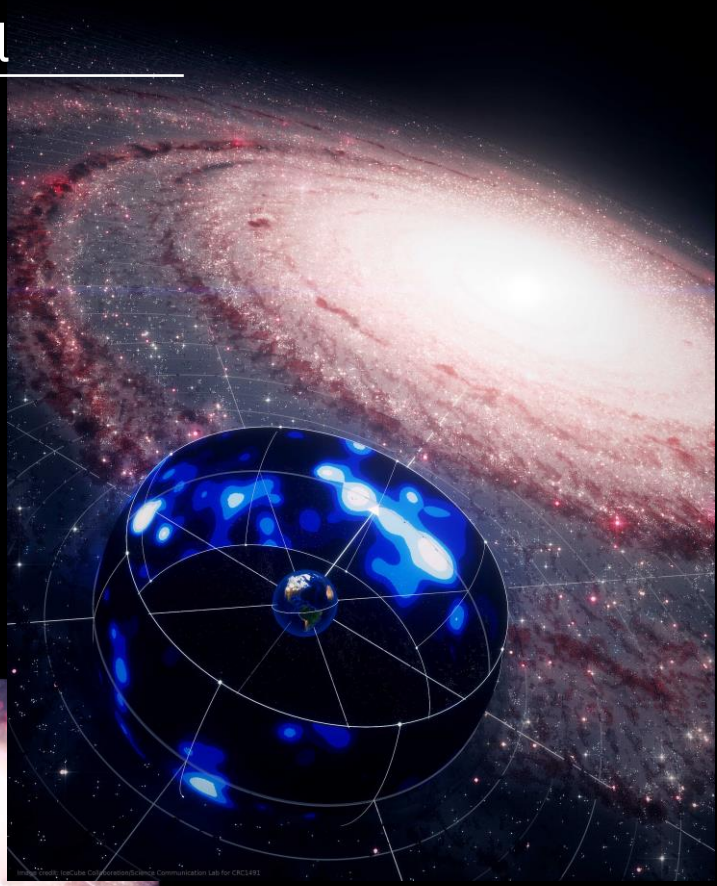

Credit: Marissa Hünnefeld


Credit: Marissa Hünnefeld

Preparing the Announcement: Outreach Material





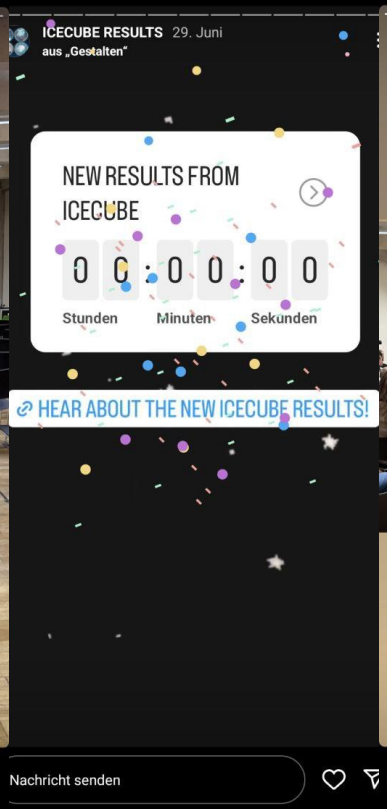


Science Communication Lab:
https://scicom-lab.com/

"The Milky Way in Neutrino Light" on YouTube

Credit: IceCube Collaboration / Science Communication Lab for CRC1491

Preparing the Announcement: Social Media Campaign



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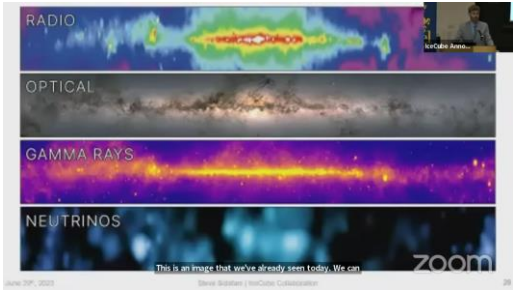
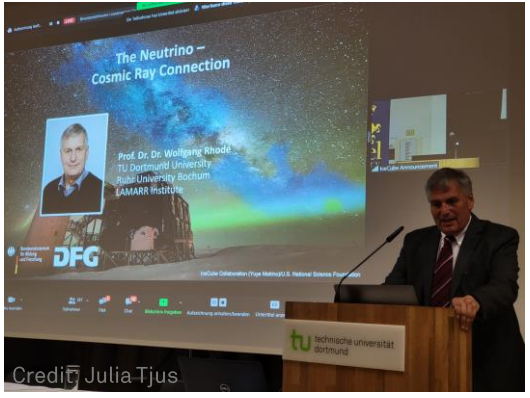
Media Impact and Reactions

29th of June 2023: Announcing the Results

Participation:

- About 80-100 on-site participants in Dortmund
- Peak number of viewers on zoom: almost 500
- YouTube: ~1600 peak during stream, ~12.5k unique viewers after 24h, 25k views now
- Funding agencies and politics represented on-site





Credit: Julia Tjus

Credit: Felix Schmale


Credit: Felix Schmale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Media Impact and Reactions

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About this Attention Score

In the top 5% of all research outputs scored by Altmetric

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- **5** Facebook pages
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- **1** Redditor
- **1** video uploader

Citations

- **9** Dimensions

Readers on

- **18** Mendeley

The New York Times

Neutrinos Build a Ghostly Map of the Milky Way

Astronomers for the first time detected neutrinos that originated within our local galaxy using a new technique.

Frankfurter Allgemeine

Wenn KI auf Neutrinos trifft

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Ghostly lights paint a new portrait of the Milky Way

Astronomy

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IceCube creates first image of Milky Way in neutrinos

Comprising thousands of detectors buried in Antarctic ice, this unique observatory produced our first view of our home galaxy using high-energy neutrinos.

By Ananya Pallvela | Published: June 30, 2023

FOCUS online

Scientists find 'ghost particles' spewing from our Milky Way galaxy in landmark discovery (video)

By Charles Q. Choi published June 29, 2023

'This observation of high-energy neutrinos opens u... new window to study the properties of our host ga...

Comments (0)

nature astronomy

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Milky Way: Icy observatory revea... 'ghost particles'

30 June

Click here for more S...

PLAY SOUND

The Weather Channel

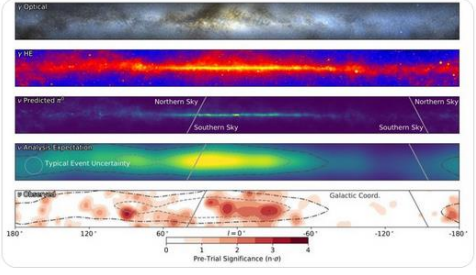
Evidence of High-Energy Neutrino Emission Found in Milky Way Galaxy | Weather.com

Astro Plot of the Week reposted

Astro Plot of the Week @PlotAstro · Jul 3

So many votes!

And now we have the newest "Astro Plot of the Week" - congratulations!



Astro Plot of the Week @PlotAstro · Jul 1

Replying to @PlotAstro

Pick one:

- Plot from the IceCube Collaboration (science.org/doi/10.1126/sc...)

- Plot from Agazie et al. (arxiv.org/abs/2306.16221)...

Show this poll

1 · 10 · 57 · 6,832

Media Impact and Reactions

@thelastcube. vor 1 Monat

This is incredible, it's a shame how this is not getting much deserved media coverage

4 Antworten

p

@pwylll vor 1 Monat

This is one of the best scientific visualizations I have ever seen. Kudos to the team that put this together and to the overall Ice Cube Collaboration. Excellent work!

3 Antworten

@Tenkster vor 1 Monat

This was a beautiful animation and a great visual reference. What a joy to watch.

1 Antworten

@ronin2292 vor 1 Monat

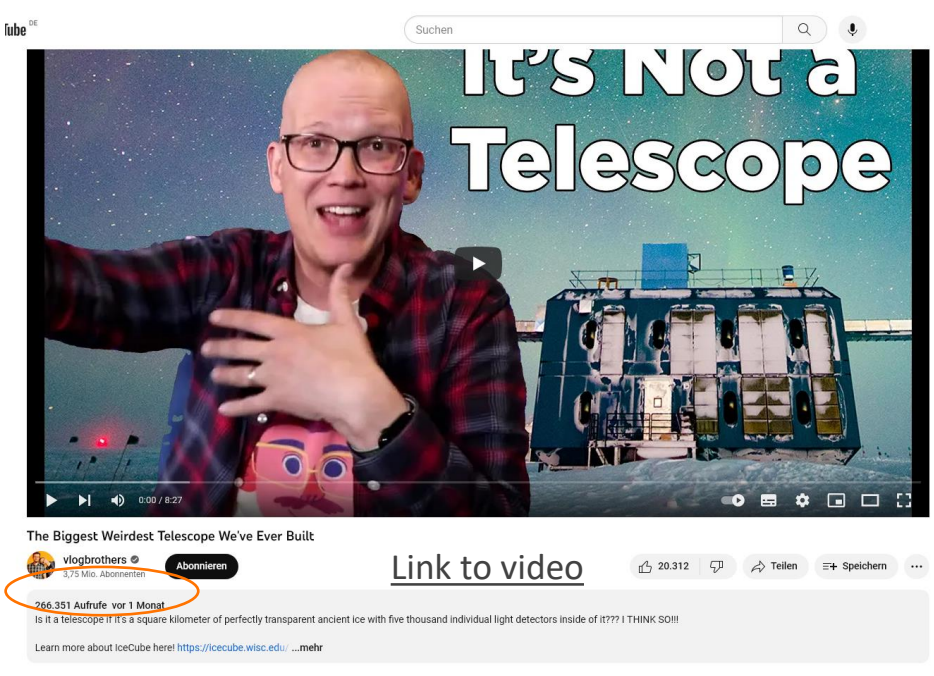
Thank you for possessing the curiosity to discover.

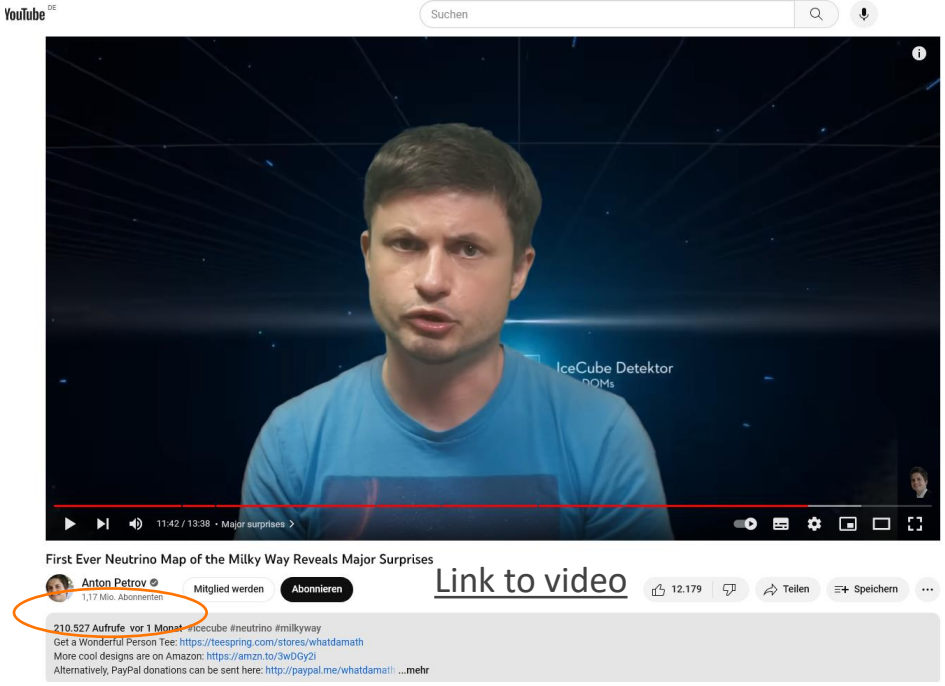
1 Antworten

"The Milky Way in Neutrino Light" on YouTube

Credit: IceCube Collaboration / Science Communication Lab for CRC1491

Media Impact and Reactions





A

@WombatOfWimbledon vor 1 Monat

Well this one went under the radar! Damn, this is important! It's the first as far as I know that we've been able to look at the universe in any medium other than EM radiation (not including gravitational waves as so far we can't tell where they're coming from with degree of accuracy useful for mapping). That's... massive. Being able to compare observations via two entirely different mediums could well show us something *truly* new about the nature of space in general.

79 Antworten

8 Antworten

C

@catherinehubbard1167 vor 1 Monat (bearbeitet)

This video is one of your best, and that's saying something. The subject is absolutely fascinating and important, but as you point out, it went under the radar in public reporting. This is the first I've heard of this. Thank you!

...

18 Antworten

1 Antwort

Summary & Conclusions

Unblinding on 20th of January 2022

- This is when we first saw the results

Preparation of event:

- A lot of moving parts and challenges
- Outreach content creation by external company
- Many people contributed over months to make this possible

29th of June 2023: Announcing the Results

- Good participation and feedback

Conclusions:

- From our perspective: we had a great number of participants and generated a good amount of attention
- However, viewer comments give the impression that this publication didn't receive enough media coverage

The New York Times

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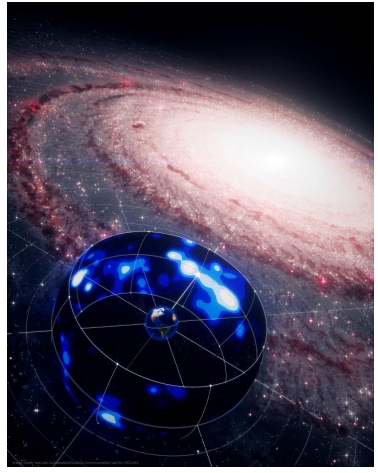

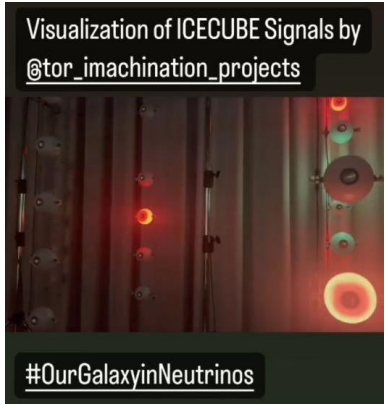

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