BLACK HOLES:
Our Galaxy's Heart Revealed
PAGE 12

RED PLANET DELIGHT:
Mars Reaches Opposition
PAGE 48

ASTROPHOTOGRAPHY:
How to Capture Light Echoes
PAGE 60

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ACCESSIBILITY

Rendering the Universe in Sound

THERE'S NO SOUND in space. But with new data methods, there could be.

In *sonification*, astronomers translate data — ranging from stars' brightness to the strength of gravitational waves — into sound. The technique most obviously, and vitally, makes such information accessible to those who are blind or have low vision. But sonification also opens up new experiences for the general public and researchers alike, Anita Zanella (National Institute for Astrophysics, Italy) and colleagues report on August 15th in *Nature Astronomy*.

Humans are generally a visually oriented species, but our other faculties have capabilities that seeing does not. For example, we're always processing audio input, and we're capable of listening to several things at once. We're especially good at filtering out noise to home in on something we want to understand.

Cardiff University's Black Hole Hunter (**blackholehunter.org**) demonstrates these concepts. A simulated signal from two merging black holes is impossible to see amidst typical background noise. But in audio form, it's a different story: Despite the roar of noise, the quiet "chirp" of coalescence is surprisingly audible.

Black Hole Hunter is an online game built for public engagement, not a research project; indeed, 36% of sonification projects list public engagement as their primary objective. Other objectives include research (26%), art (17%), accessibility (13%), and education (8%), according to Zanella's analysis.

Even so, "data as sound" has been enabling scientific exploration for decades, from the discovery of the cosmic microwave background to the study of lightning-induced plasma waves known as "whistlers."

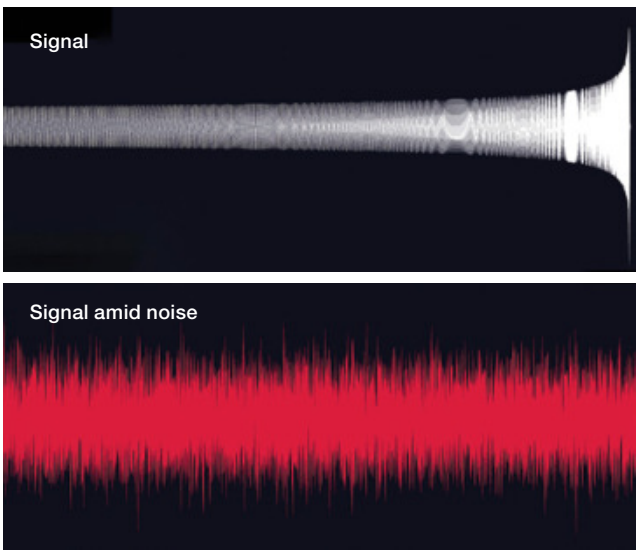
More recently, sonification efforts have been ramping up. In addition to serving the blind and those with low vision, the technique also appeals to those with dyslexia, autism, and anyone interested in listening to data, Zanella and colleagues note. They find that the cumulative number of sonification projects has been increasing rapidly since 2010, to a total of 98 as of December 2021. However, it will remain a niche approach until it can be standardized.

For example, understanding uncertainty in the data can be vital to distinguishing real differences from noise. But most sonification efforts don't include error bars. We need more studies to gauge how well different techniques work, Zanella's team concludes.

Henry Winter (ARISA Lab), who wasn't involved in the study, adds that studies require support: "I think that all of those challenges result from a lack of funding for serious sonification and accessibility work."

■ MONICA YOUNG

Hear examples at https://is.gd/sonification.



BLACK HOLE HUNTER / CARDIFF UNIVERSITY / CC BY-SA 4.0

◀ The gravitational-wave signal expected from two colliding black holes (*top*) is difficult to distinguish visually in a realistic depiction of background noise (*bottom*). But listen to the same data and you can hear the quiet "chirp" amid the noisy roar.

IN BRIEF

Korea's Orbiter Heads for the Moon

South Korea's first Moon mission, the Korea Pathfinder Lunar Orbiter, launched successfully on August 5th. Now officially called Danuri, the $180-million mission will test technologies for an eventual orbiter, lander, and rover. The solar-powered spacecraft will arrive in lunar orbit by December 16th, then it will scout out the Moon's surface using six instruments. One from NASA will search for water ice in permanently shadowed craters. Another four instruments from the Korea Aerospace Research Institute (KARI) will return data on surface composition and texture, local magnetic "swirls," and future landing sites. The final instrument, also built by KARI, is an experimental payload to test a rudimentary interplanetary internet and address the technical issues that arise in a communications network that lacks continuous connectivity. Danuri will start one year of science operations in early 2023. If the mission performs well, an extended science phase might have it skimming even closer over the lunar surface.

■ DAVID DICKINSON

AAVSO Selects New Director

The American Association of Variable Star Observers (AAVSO), founded in 1911, is pleased to welcome Brian Kloppenborg as the new Executive Director, effective September 16th. "Brian brings to AAVSO the skills needed to advance our scientific impact, combined with experience in management and project budgeting," notes AAVSO President David Cowall. Prior to joining the AAVSO, Kloppenborg worked as a research scientist at Georgia Tech Research Institute. He holds a PhD in physics with an astrophysics specialty, from the University of Denver, and a B.A. in Physics from Hastings College. Brian also ran a small business that provided data science, machine learning, and GPU accelerated computing services. His research interests span photometry, spectroscopy, astrometry, and long-baseline optical interferometry of eclipsing binaries, novae, and young stellar objects. "With my background," Kloppenborg says, "not only do I understand where the science is and how the AAVSO can contribute to it; but also how to raise funds and implement successful programs."

■ LINDSAY WARD