

Scientists create cosmic sounds of Voyager 1

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Artist's concept of NASA's Voyager spacecraft. Credit: NASA/JPL-Caltech

Music created entirely from data beamed back from the Voyager 1 spacecraft will receive its world premiere at the NASA booth at the SC17 Supercomputing Conference in Denver, Colorado, at 8pm local time (MST) on Monday, 13 November.

Produced to celebrate the 40th birthday of Voyager 1, the three-minute piece is based on information captured by its Low-Energy Charged Particle (LECP) instrument, a special telescope designed to identify protons, alpha particles, and heavier nuclei in [space](#).

Each number, which represents an average 26-day measurement received by NASA's Space Physics Data Facility from 1977 until as recently as last week, is converted into a musical note, creating a melody that accurately follows the entire journey of the spacecraft.

To produce the music, Dr Domenico Vicinanza, of Anglia Ruskin University and GEANT, and Dr Genevieve Williams, of the University of Exeter, used a process called data sonification to map the measurements and flight characteristics to melody, harmony and orchestration.

The sonification is based on measurements coming from the LECF depicting the dramatic changes detected first when Voyager 1 approached Jupiter, then Saturn and finally when it left the solar system in 2012 and entered interstellar space, which is the region between stars filled with material ejected by the death of nearby stars millions of years ago.

The main melody comes from the sonification of the cosmic ray count and is played by the second violins for data up until 2012, and then by flute, piccolo and glockenspiel. Piano and French horns double the violins during the Jupiter and Saturn encounters, highlighting the rising and falling of the cosmic ray count while entering and exiting the atmospheres of the planets.

The transition from the heliosphere to the [interstellar space](#) is accompanied in changes in the orchestration and harmony, as well as a change in the music key (tonality) from C major to E flat major.

Dr Vicinanza, Director of the Sound And Game Engineering (SAGE) Research Group at Anglia Ruskin University, said: "Our orchestra score is more than just inspired by one of the most successful space missions of all time, it is shaped entirely by Voyager 1's incredible journey.

"Data sonification can play an important role in helping to share scientific discoveries and we hope that by converting 40 years of data into music, listeners will be able to hear aspects of Voyager 1's journey that are perhaps not so obvious when looking at graphs of data."

Provided by Anglia Ruskin University

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