

Einstein's Cosmic Messengers Shake Beckman

By Dennis Callahan

STAFF WRITER

On Thursday night Caltech hosted the world premiere of "Einstein's Cosmic Messengers," an astrophysics-infused multimedia concert by Andrea Centazzo aimed at artistically interpreting the relativistic phenomenon of gravitational waves.

The event took place in Beckman auditorium as an interdisciplinary effort to describe, celebrate and interpret the cosmic waves, a major consequence of Einstein's theory of gravity that has fascinated physicists for nearly a century. The event featured three segments, each designed to complement the other two in an ambitious effort to uniquely combine science, technology and art. Caltech's renowned Feynman Professor of Theoretical Physics, Kip Thorne, first described the science behind astrophysics and relativity, followed by Jay Marx, executive director of LIGO, or Laser Interferometer Gravitational-Wave Observatory, who described the principles and capabilities of the extraordinary technological effort to first detect the elusive waves. The centerpiece of the evening was a whirling artistic exploration of gravitational waves by Andrea Centazzo, an award winning percussionist and multimedia artist.

Thorne's introduction to what he termed the "warped side of the universe," filled with black holes, colliding neutron stars, and, of course, gravitational waves,

was more than appropriate for the mixed audience of children, students, professionals and retirees. He managed to describe, without a single equation, not only Einstein's prediction of the waves, but also the process of their creation and their ultimate relevance and value to science. His almost childlike enthusiasm for the subject justified his introductory quote from Einstein, "Everything wants to be where it ages most slowly." Indeed, the majority of the audience most likely paid for the gasoline fair to the auditorium with their Social Security checks. Still, the ability to instill the excitement of science in people of all ages is something only a few can pull off, and Thorne certainly deserves this distinction.

Jay Marx, executive director of LIGO, did an exceptional job at describing both verbally and graphically how the giant interferometer works. It had been mentioned that the detection of gravitational waves would require unprecedented sensitivity, but when Marx mentioned the actual number (detection of displacements of 1/1000th of the size of a proton) it must have been hard even for the non-student to take him seriously. Any doubts were soon cleared when he revealed recent data which showed that after years of refinement, LIGO had finally reached its target sensitivity. This excitement was soon extinguished, though, when he revealed the anti-climax,

that LIGO had not yet actually observed any gravitational waves after 2-3 years of operation. Marx remained optimistic, though, as he described future plans for modifications of LIGO as well as an outline of a future non-terrestrial based interferometer labeled LISA, or Laser Interferometer Space Antenna. Marx remained convinced that both the improved LIGO and eventual realization of LISA would certainly provide us with observation of gravitational waves in the future. Although the fact that the waves had not yet been observed may have been a disappointment for some, it does not conflict with the evening's intentions, as it must have encouraged the audience to stay informed with current developments in astrophysics.

In what was most likely the world's first ever musical interpretation of gravitational waves, Andrea Centazzo ended the evening in an appropriate display of percussion, vibration, resonance and imagery. The concept of the performance was conceived by Centazzo and Michele Vallisneri, a theoretical physicist at JPL, and the multimedia written and compiled by Centazzo. The artist sat surrounded by percussion instruments, synthesizers and, of course, his MacBook, emanating vibrations from the stage in what must have been an audio wave analog of two colliding black holes. An animated Centazzo spun and

pounded amid a backdrop video montage saturated with images of historical scientists, numbers, equations, spinning galaxies and computer simulations of propagating gravitational waves. The video was appropriate accompaniment for a mostly percussion-based musical piece, but was not without its imperfections. The relevance of a number of images was not immediately clear, and the video segments shot with real actors may have been a bit too much. Einstein did not wear that much hair gel! It may have been difficult for some viewers to understand his musical interpretation, but not as difficult as it may have been for Centazzo to interpret something that has yet to even be observed. Ultimately, the five part performance demanded one of the most essential qualities of any great scientist, patience. In the end, those audience members who possessed this quality were not disappointed.

The bridge between science and art has never been easy to construct, but with these three masters plugging away from opposite ends, on Thursday night we may have gotten as close as we're ever going to get.

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