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Warped Opera

August 24, 2009

Science inspires art in all kinds of surprising ways. An [article in SEED](#) last week focused on a new opera by Spanish composer Hector Parra, that debuted earlier this year in Paris: *Hypermusic Prologue*. The work was inspired by theoretical physicist Lisa Randall's popular science book, *Warped Passages*. The son of a physicist, Parra read the book and became fascinated by Randall's description of how hidden dimensions might explain why, for example, the gravitational force seems so much weaker than the other fundamental forces. And he approached her about writing a libretto for his new opera.

Parra's opera is decidedly modern, with an experimental score, as befitting such cutting-edge physics theories. There are only two roles and minimalist, abstract stage design by artist Matthew Ritchie -- apparently he makes sculptures inspired by inflationary universe theory, so *Hypermusic Prologue* was a natural fit for his talents.




Randall's book describes her seminal work with fellow physicist Raman Sundrum on model-building -- developing testable mini-theories of higher dimensions in the universe, rather than shooting for a full-fledged Theory of Everything, as with conventional string theory (as if string theory could ever be described as fully conventional).

String theory imagines extra dimensions -- beyond the three spatial and one temporal dimension that make up the observable fabric of space-time -- that are large, perhaps even the size of a universe, rather than tiny curled up extra dimensions the smallest possible Planck scale? Randall and Sundrum propose a model in which our universe is the usual four-dimensional brane (short for "membranes," and in this context describing surfaces that exist in higher dimensional space). The twist: that brane exists on the surface of a five-dimensional space. Gravity is the only force that is not limited to the four-dimensional brane-world. It can seep into the higher dimension(s) as well, thus making it seem weaker than the other forces.

These are heady concepts, and they make for a heady opera. Randall's libretto employs the notion of extra dimensions as a metaphor for "another view" that is "hidden yet true." Parra's score, meanwhile, uses sounds and instruments to evoke warped spacetime and changes in energy, mass, time and gravity. Per the SEED article:

"As the soprano approaches a gravitationally strong part of the universe, for example, her voice is electronically treated to make her phrases shorter in mathematically precise increments and the orchestra matches this shorter phrasing. As she enters a hidden fifth dimension, her voice gets louder and the music gets sonically richer, while Bobby's [the baritone, James Bobby's] voice -- stuck in the lower-dimensional universe -- remains digitally untreated and becomes softer and thinner."

Barcelona will host a run of *Hypermusic Prologue*, and from there it will tour Luxembourg and Brussels. Look for a special adaptation to come to New York's Guggenheim Museum in January.

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about

Jennifer Ouellette is the author of "Black Bodies and Quantum Cats: Tales from the Annals of Physics" and "The Physics of the Buffyverse", holds a black belt in jujitsu, and lives in Los Angeles with a tall cosmologist named Sean.

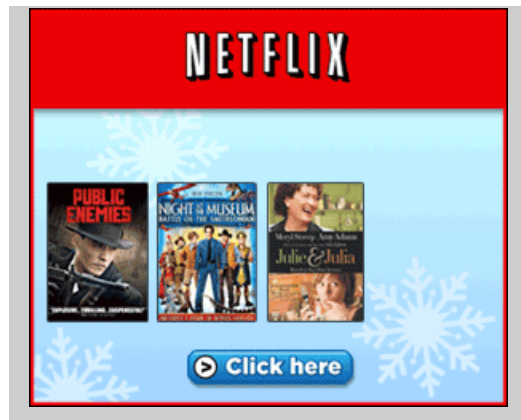


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