

Trio behind supergravity breakthrough win Special Breakthrough Prize in Fundamental Physics

August 7 2019, by Bob Yirka



The Breakthrough Prize trophy was created by Olafur Eliasson. “The whole idea for me started out with, ‘Where do these great ideas come from? What type of intuition started the trajectory that eventually becomes what we celebrate today?’” Like much of Eliasson's work, the sculpture explores the common ground between art and science. It is molded into the shape of a toroid, recalling natural forms found from black holes and galaxies to seashells and coils of DNA. Credit: Breakthrough Prize

The three physicists credited with "the invention of supergravity" have won the Special Breakthrough Prize in Fundamental Physics for their work nearly 40 years ago. The announcement was made by the Selection Committee. In addition to the award, the three physicists—Sergio Ferrara, Daniel Freedman and Peter van Nieuwenhuizen—will also share 3 million dollars.

The Special Breakthrough Prize is an additional prize awarded by the team at Breakthrough Prize—other prizes by the group are also awarded annually. The Special Breakthrough Prize can be given out any time the committee chooses to do so. Prior winners have included Stephen Hawking, the team involved with the discovery of the Higgs Boson and the team involved in first detecting gravitational waves.

The Breakthrough Prize organization was started by Russian billionaire Yuri Milner. It is now sponsored by some very big names in the world of science and philanthropy, with a list that includes: Mark Zuckerberg, Sergey Brin, Anne Wojcicki, Yuri and Julia Milner, Ma Huateng and Priscilla Chan.

The Breakthrough Prize committee explained that the work was awarded the prize because of its major impact on the field of physics. It essentially showed a means for unifying all four of the fundamental forces of nature. It built on the work of prior [physicists](#) who had developed the idea of supersymmetry. At the time, the theory was considered limited because it did not include gravity., Freedman, Ferrara and van Nieuwenhuizen overcame that limitation by carrying out the math to allow for the inclusion of "gravitinos," which they described as super-fermion partners to gravitons (theoretical particles that carry gravity). Some have described it as a supersymmetric version of the theory of gravity as described by general relativity. The committee also noted that the work has made a strong impact on the field of theoretical physics over the past 40 years—most particularly on the study of

supersymmetry, which was eventually integrated into string theory.

Daniel Freedman is currently a visiting professor at Stanford University. Peter van Nieuwenhuizen is a Distinguished Professor of Physics at Stony Brook University and Sergio Ferrara works at CERN as an INFN associate.

More information: breakthroughprize.org/News/53

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Citation: Trio behind supergravity breakthrough win Special Breakthrough Prize in Fundamental Physics (2019, August 7) retrieved 18 April 2024 from <https://phys.org/news/2019-08-trio-supergravity-breakthrough-special-prize.html>

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