The 2014 Dirac Medal to Gabriele Veneziano

G. C. Rossi 21-11-2014 http://www.primapagina.sif.it/article/171

From left to right: Gabriele Veneziano, Ashoke Sen and Andrew Strominger.
Courtesy of ICTP.

The 2014 Dirac Medal was awarded to Ashoke Sen (Harish-Chandra Research Institute, India), Andrew Strominger (Harvard University, USA) and Gabriele Veneziano (CERN, Switzerland and Collège de France, France) in recognition of their fundamental contributions to the "origin, development and further understanding of string theory".

String theory provides a mathematically consistent framework where quantum mechanics can happily marry gravitation, giving birth to quantum gravity. It represents today the only candidate for a unified description of the four known forces of nature, strong, electromagnetic, weak and gravitational.

The extraordinary adventure of string theory started with the Veneziano's seminal paper

"*Construction of a crossing-symmetric, Regge behaved amplitude for linearly-rising trajectories*", published in 1968 on Il Nuovo Cimento A, where a closed expression for a meson-meson amplitude incorporating exact duality was proposed. Though worked out in the framework of S-matrix hadron physics, this simple formula was the seed for all the successive amazing developments that led to modern string theory.

The latter sprung from the works of Amati, Fubini, Gordon and Veneziano who paved the way to the interpretation of the dual intermediate states as string oscillations. In collaboration with colleagues at the MIT group of which Veneziano was a member in the 70's, and in particular with Fubini, the operator formulation of the Dual Resonance Model was developed, with the introduction of the concept of vertex operator and the contour method.

After recognizing that the original formula could be looked at as the amplitude for the scattering of two bosonic open strings, if only the Regge trajectory slope was interpreted as a Planck related scale, applications of the emerging conceptual framework under this new perspective led to innovative and far-reaching ideas on cosmology, opening the road to the construction of interesting pre-Big-Bang scenarios, and to a deeper understanding of black holes together with an exact calculation of their entropy.

The forthcoming LHC experiments will tell us whether string theory is lurking to us behind the gigantic ATLAS and CSM apparatuses.