PROGRESS IN N=2 SUPERSYMMETRIC FIELD THEORY

Gregory W. Moore

Rutgers University

Four dimensional field theories with N=2 supersymmetry are an important laboratory for finding exact nonperturbative results in field theory. They also have many significant mathematical applications. This talk will describe an interesting class of theories arising from compactification of a hypothetical six-dimensional theory with (2,0) supersymmetry on a Riemann surface, as well as some progress in finding exact results on the "BPS spectrum" of these theories. The techniques that are used in these investigations have interesting applications to the mathematics of moduli spaces, cluster varieties, hyperkahler geometry and WKB methods for linear differential equations of rank greater than two. The work describes results from [1, 2, 3, 4] as well as work to be published in the near future.

Keywords: BPS state, wall-crossing, hyperkahler metric, Hitchin systems, (2,0) theories

[1] D. Gaiotto, G. W. Moore and A. Neitzke, "Four-dimensional wall-crossing via three-dimensional field theory," Commun. Math. Phys. **299**, 163 (2010) [arXiv:0807.4723 [hep-th]].

[2] D. Gaiotto, G. W. Moore and A. Neitzke, "Wall-crossing, Hitchin Systems, and the WKB Approximation," arXiv:0907.3987 [hep-th].

[3] D. Gaiotto, G. W. Moore and A. Neitzke, "Framed BPS States," arXiv:1006.0146 [hep-th].

[4] D. Gaiotto, G. W. Moore and A. Neitzke, "Wall-Crossing in Coupled 2d-4d Systems," arXiv:1103.2598 [hep-th].