Institut Henri Poincaré

11 rue Pierre et Marie Curie, 75231 Paris cedex 05

String Theory in Greater Paris

Rencontres Théoriciennes

"Supergravité, théorie des cordes et théorie M"

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Alessandro Sfondrini

Humboldt University, Berlin

Integrability for AdS3/CFT2

Gravity theories with negative cosmological constant in three dimensions (such as AdS3) play an important role in the understanding of black hole physics, and provided an early example of holography. Their dual 2-dimensional conformal field theories (CFT2) are quite special, since they enjoy (suitable super-symmetric extensions of) Virasoro symmetry. This duality naturally emerges in string theory too, for instance as the near horizon limit of a system of D1/F1-strings and D5/NS5-branes and was much studied in the early days of the Maldacena correspondence.

Recently, the interest in Ad3/CFT2 was revived when Babichenko, Stefanski and Zarembo showed that the maximally super-symmetric AdS3 backgrounds yield classically integrable string non-linear sigma models. It is natural to ask whether the S-matrix integrability approach, which works beautifully for the planar limit of AdS5/CFT4, can be applied here as well. The answer did not appear to be straightforward, due to several new features and some conceptual complications of AdS3/CFT2, and indeed eluded us for four years.

In my talk I will provide substantial evidence for an affirmative answer. To do this, I will discuss in detail the simplest case of superstrings on AdS3xS3xT4, argue how the same approach can be extended to more general cases, and describe the exciting future directions for this integrability program.

Institut Henri Poincaré, salle 314, 3ème étage

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