

# 西北大学物理学科创建 100 周年系列学术报告第八十八讲



## Academic Presentations in Physics

### 物理学系列学术报告

报告题目: **The Panorama of Spin Matrix theory**

报告人: 雷扬 副教授, 苏州大学

报告时间: 2023 年 11 月 24 日 (星期五) 10:00

报告地点: 物理楼 856

报告摘要:

Spin Matrix theory describes near-BPS limits of  $N = 4$  SYM theory, which enables us to probe finite  $N$  effects like D-branes and black hole physics. In previous works, we have developed the spherical reduction and spin chain methods to construct Spin Matrix theory for various limits. In this paper, by considering a supercharge  $Q$  which is cubic in terms of the letters, we construct the Hamiltonian of the largest Spin Matrix theory of  $N = 4$  SYM, called the  $PSU(1, 2|3)$  Spin Matrix theory, as  $H = \{Q, Q^\dagger\}$ . We show the resulting Hamiltonian is automatically positive definite and manifestly invariant under supersymmetry. The Hamiltonian is made of basic blocks which transform as supermultiplets. A novel feature of this Hamiltonian is its division into D-terms and F-terms that are separately invariant under  $PSU(1, 2|3)$  symmetry and positive definite. As all the other Spin Matrix theories arising from  $N = 4$  SYM can be acquired by turning off certain letters in the theory, we consider our work as revealing the “Panorama” of Spin Matrix theory.

报告人简介:

雷扬, 苏州大学副教授。2011 年于北京大学取得物理学和数学双学士学位。2016 年于 Durham University 获得博士学位。随后在中国科学院理论物理研究所, University of Witwatersrand, Niels Bohr Institute 和中国科学院大学卡弗里理论科学研究所从事博士后研究。2022 年起在苏州大学任副教授。

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