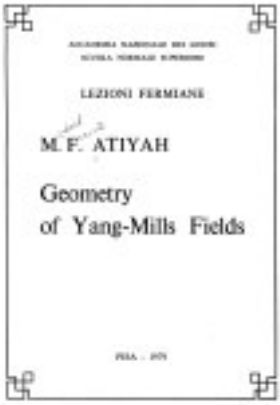
Geometry of Yang-Mills Fields



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These Lecture Notes are an expanded version of the Fermi Lectures Atiyah gave at Scuola Normale Superiore in Pisa, the Loeb Lectures at Harvard and the Whittemore Lectures at Yale, in 1978. In all cases he was addressing a mixed audience of mathematicians and physicists and the presentation had to be tailored accordingly. Throughout, Atiyah presented the mathematical material in a somewhat unorthodox order, following a pattern which he felt would relate the new techniques to familiar ground for physicists.

The main new results presented in the lectures, namely the construction of all multi-istanton solutions of Yang-Mills fields, is the culmination of several years of fruitful interaction between many physicists and mathematicians. The major breakthrough came with the observation by Ward that the complex methods developed by Penrose in his “twistor programme” were ideally suited to the study of the Yang-Mills equations. The instanton problem was then seen to be equivalent to a problem in complex analysis and to one in algebraic geometry. Using the powerful

methods of modern algebraic geometry it was not long before the problem was finally solved.

作者介绍:

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标签

数学

微分几何

Math

Atiyah

Geometry

英国

物理學

物理-场论

评论

把一个简单的环境下的复杂对象转化为复杂环境下的简单的对象。彭罗斯的扭结理论研究杨米尔斯到ward用复分析转化，孤立子理论从复分析到代数几何研究：四球上杨米尔斯方程自对偶的解对应投射空间上实代数丛，经典紧群下
孤立子有唯一的线性代数表示。概念可以抽象为代数，证明模式也可以抽象化。联络理解为纤维无穷小移动，而曲率理解为相移

留下一個疑問：1979年YM場還沒成功量子化？？

算是历史书了，讲的漂亮，开头介绍吊打众物理学家...

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书评

1948年的春天，物理学家们在Pennsylvania的Pocono Mountain举行了一次盛会。会议由Oppenheimer主持，与会者包括Bohr父子, Dirac, Fermi, von Neumann, Wigner, Teller, Bethe等巨擘，主角却是当时初露峥嵘的Schwinger和Feynman. 两人都试图介绍他们在量子电动力学方面的新想法...

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