スーパーグローバルコース数学特別講演会

How the Green Light Was Given for Gravitational Wave Search

10 月 11 日（火）
17:00-18:00

理学研究科セミナーハウス

Professor
Pawel Nurowski

Center for Theoretical Physics,
Polish Academy of Scineces

The recent detection of gravitational waves by on-Earth laboratories is an incredibly impressive achievement of experimental physics. It is also a tremendous success of the theory of general relativity. It confirms the existence of black holes, shows that binary black holes exist and that they may collide, and that during the merging process gravitational waves are produced. These are all predictions of general relativity theory in its fully nonlinear regime.

It is well known that after predicting gravitational waves in 1916 Einstein became uncertain about their physical reality. It wasn't until the 1950's and early 60's that their physical status was clarified. Important contributions to the development of the theory of gravitational radiation were made by Hermann Bondi, Felix Pirani, Roger Penrose, Ivor Robinson and Andrzej Trautman. In particular, in 1958, Andrzej Trautman from Leopold Infeld's relativity group in Warsaw delivered a series of highly influential lectures on gravitational radiation at King's College London, which established the foundations of the gravitational wave theory.

In this talk we show how the Einstein's intuitive concept of a gravitational wave was evolving from the linearized gravity to a precise mathematical notion in the fully nonlinear Einstein's General Relativity. Since Trautman's PhD thesis from 1958 we know that a gravitational wave is a solution of a certain boundary value problem for the Einstein equations. In my talk I also briefly show how the existence theorem for this mathematical problem was proven. This stablished the reality of gravitational radiation. This achievement of 25years old Trautman was one of the first instances of the use of recently fashionable `geometric analysis'.

参加希望者は下記ＵＲＬの
Googleフォームにて申込を行って下さい

URL：https://forms.gle/yUMzws4F1ugnnFQ27

締切日：１０月７日(金)１８時（先着４８名）

キーワード：
重力波、微分幾何学

「重力波の数学的側面」に関する
学部生・大学院生向けの講義です。
専門的な知識は必要としません。

京都大学スーパーグローバル大学創成支援事業
数学系ユニット
https://ktgu.math.kyoto-u.ac.jp/