香 港 大 學
THE UNIVERSITY OF HONG KONG

Institute of Mathematical Research
Department of Mathematics

Frontiers of Mathematics Lecture

Positivity of Vector Bundles and Hodge Theory*

Date : September 13, 2017 (Wednesday)

Time : 5:30 – 6:30 pm (*Tea Reception starts at 5:00 pm*)

Venue : Lecture Theatre C, LG1/F, Chow Yei Ching Building, The University of Hong Kong

Professor Phillip A. Griffiths

Institute for Advanced Study (IAS), Princeton, USA
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Abstract

The general theme of this talk will be "The unreasonable effectiveness of curvature in algebraic geometry". After a general discussion of measures of positivity and singularities of metrics and curvature, we will explain how the curvature of bundles arising from Hodge theory has signs and has mild singularities. As an application we will be able to define and describe properties of the Hodge-theoretic Satake-Baily-Borel completion of the image of the period mapping of the Kollár-Shepherd-Barron-Alexeev moduli space of varieties of general type. In the non-classical case (i.e. the period domain is not Hermitian symmetric) entirely new phenomena arise.

*Largely based on joint work with Mark Green, Radu Loza and Colleen Robles.

Biography

Professor Phillip A. Griffiths, Member of the National Academy of Sciences of the United States, is Professor Emeritus of Mathematics of the Institute for Advanced Study (IAS), Princeton, USA. Formerly Professor of Mathematics at Princeton University (1968-1972), Harvard University (1972-83), Provost and James B. Duke Professor of Mathematics at Duke University (1983-1991), Director of the IAS (1991-2003) and Professor of Mathematics at the IAS (2004-2009), he has been Professor Emeritus of Mathematics at the IAS since 2009. Professor Griffiths is a major figure in the field of geometry. Especially, he initiated with his collaborators the theory of variation of Hodge structure, which has come to play a central role in many aspects of algebraic geometry and its uses in modern theoretical physics. In addition to algebraic geometry, he has made contributions to differential and integral geometry, geometric function theory and the geometry of partial differential equations.

In 2008 Professor Griffiths was awarded the Wolf Prize (jointly with Deligne and Mumford) and the Brouwer Medal. In 2014 he was awarded the Leroy P. Steele Prize for Lifetime Achievement by the American Mathematical Society and the Chern Medal for lifetime devotion to mathematics and outstanding achievements at the International Congress of Mathematicians. Professor Griffiths has served in numerous committees for the advancement of mathematics, science and engineering. Especially, he was Chair (1992-1999) of the NRC (National Research Council) Committee on Science, Engineering and Public Policy, Chair (1995-1998) of the Program Committee of the International Congress of Mathematics, Chair (2005-2008) of the NRC Mathematical Sciences Education Board, and Chair (1999-2016) of the Science Initiative Group at the IAS, which fosters science in the developing world through programs such as the Carnegie–IAS African Regional Initiative in Science and Education.

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$$\delta_2 \qquad \delta_1$$

$$\begin{pmatrix} \int_{\gamma_1} \omega^1 & \cdots & \int_{\gamma_b} \omega^1 \\ \vdots & & \vdots \\ \int_{\gamma_1} \omega^h & \cdots & \int_{\gamma_b} \omega^h \end{pmatrix}$$