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Friedrich-Hirzebruch-Kolloquium

Modular forms and their appearances in physics

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21.12.2017, 16:00 Uhr, Hörsaal M 5

Modular forms, which are among the most beautiful and important objects in number theory, are functions of a complex variable with an infinite group of symmetries and that also often lead via their Fourier expansions to interesting arithmetical functions. They have important applications in many parts of pure mathematics, ranging from Diophantine equations to differential geometry to coding theory, but in recent years also many different kinds of applications in mathematical physics.

In the talk, which assumes no prior knowledge, I will try to explain what modular forms (and a more recent variant called "mock modular forms") are, with explicit examples, and then describe two or three of their most surprising recent appearances in physics: in connection with the string theory of black holes; in connection with the various brands of "moonshine" (the "monstrous" version discovered in the 80's and the "Mathieu" and "umbral" versions discovered recently); and in connection with "Nahm's conjecture", which came originally from conformal field theory and has now been proved (by Calegari, Garoufalidis and myself) and discovered to be related to quantum invariants of knots.

Im Anschluss an den Vortrag findet ein Empfang im Erdgeschoss des Fachbereichsgebäudes statt.

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