

Title: On two generalisations of Hitchin's equations in four dimensions from Theoretical Physics

Abstract: This talk is about two kinds of generalisations of Hitchin's celebrated equations on Riemann surfaces to ones in dimension four, which have the origin in N=4 super Yang-Mills theory in four dimensions. We call them Vafa-Witten and Kapustin-Witten equations. This talk first recalls Hitchin's equations on Riemann surfaces. We then introduce the above-mentioned two sets of equations on four-manifolds and convey recent progress on the studies of the moduli spaces of solutions to these sets of equations from both analytic and algebraic aspects.