

UM Physics Department

Miami 2020 Physics Conference (Online)

Name: Iosif Bena

Title: Does String Theory have de Sitter vacua

Abstract:

String Theory is believed to have more than 10^{500} possible compactifications to four dimensions, leading to de Sitter universes whose physics resembles that of our universe. This is often invoked as supporting the "anthropic principle": our universe is but one of this multitude of universes (multiverse), and the physical parameters we observe in our universe are selected by requiring life to exist. This anthropic reasoning is becoming a more and more popular explanation to the extremely difficult task of explaining the enormous amount of fine-tuning of the cosmological constant and of the electroweak scale. The 10^{500} de Sitter vacua are constructed in low-energy effective theories that contain ingredients drawn from String Theory. I will present three String-Theory calculations that reveal incompatibilities between these ingredients. These calculations appear to rule out KKLT-type constructions of stable de Sitter vacua in String Theory, as well as other similar constructions. They support the recent swampland conjectures that stable de Sitter vacua in controllable regimes of parameters do not exist in String Theory.