

Topology Seminar

Lukas Brantner

of The University of Oxford and Université Paris-Saclay (CNRS) will
be speaking on

On deformations and lifts of Calabi-Yau varieties in characteristic p

on November 28 at 4:30 in
MIT Room 2-131

A smooth projective variety Z is said to be Calabi-Yau if its canonical bundle is trivial. I will discuss recent joint work with Taelman, in which we use derived algebraic geometry to study how Calabi-Yau varieties in characteristic p deform. More precisely, we show that if Z has degenerating Hodge-de Rham spectral sequence and torsion-free crystalline cohomology, then its mixed characteristic deformations are unobstructed; this is an analogue of the classical BTT theorem in characteristic zero. If Z is ordinary, we show that it moreover admits a canonical lift to characteristic zero; this extends classical Serre-Tate theory. Our work generalises results of Achinger-Zdanowicz, Bogomolov-Tian-Todorov, Deligne-Nygaard, Ekedahl-Shepherd-Barron, Schröer, Serre-Tate, and Ward.

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