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New tachyon-free non-SUSY heterotic vacua in six and four dimensions

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It is widely known that non-supersymmetric heterotic theories are plagued by instabilities ascribed to the presence of tachyons or dilaton tadpoles. Moreover, geometric compactifications admit the presence of moduli, which may be used to deform the model, once non-trivial Wilson lines are turned on. For instance, in nine dimensions, tachyon-free theories can be connected to tachyonic ones, thus jeopardising the tree-level stability of the vacuum. In this picture, truly non-supersymmetric tachyon-free heterotic models in lower dimensions are hard to find and one should require more sophisticated non-geometric constructions, such as asymmetric or quasi-crystalline orbifolds, which only exist on special points of the moduli space and cannot be further deformed. In this presentation, I will discuss specific asymmetric orbifolds in six and four dimensions, which do not admit deformation moduli and provide truly non-supersymmetric tree-level tachyon-free vacua with reduced rank.

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