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Tamar Friedmann* (tamarf1@yahoo.com). *From singularities to algebras to pure Yang-Mills with matter.*

Since the advent of dualities in string theory, it has been well-known that codimension 4 orbifold singularities that appear in extra-dimensional spaces, such as Calabi-Yau or G_2 spaces, may be interpreted as ADE gauge theories. As to orbifold singularities of higher codimension, there has not been an analog of this interpretation. In this lecture, I will show how the search for such an analog led me from the singularities to the creation of Lie Algebras of the Third Kind ("LATKs"). I will introduce an example of a LATKe that arises from the singularity C^3/Z_3 , and prove it to be simple and unique. I will explain that the uniqueness of the LATKe serves as a vacuum selection mechanism. I will also show how the LATKe leads to a new kind of gauge theory in which the matter field arises naturally and which is tantalizingly close to the Standard Model of particle physics. (Received June 29, 2011)