Effective Field Theories for Kaluza-Klein Modes[1] SKY BAUMAN, University of Arizona — In a collider experiment, the appearance of a tower of Kaluza-Klein particles would be the signature of an extra dimension. Relations between parameters characterizing a Kaluza-Klein tower are readily predicted when quantum effects are ignored. For example, a single flat extra dimension compactified to a circle leads to Kaluza-Klein modes whose masses are integral multiples of the compactification scale and whose couplings are universal. However, radiative corrections renormalize masses and couplings. In this talk, I investigate the extent to which such corrections distort tree-level relations for Kaluza-Klein spectra. As toy models, I consider a five-dimensional scalar ϕ^4 model and a five-dimensional Yukawa theory involving both scalars and fermions. One unexpected result is that the squared masses of the fermions in Yukawa theory receive corrections which actually grow with mode number. Another is that a γ^5 interaction is induced in this theory. Although small, such corrections may lead to observable effects at future colliders. These computations were possible only with new calculational techniques I developed for Kaluza-Klein theories. I will discuss these methods, along with their implications for other calculations.

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