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Asymptotic Grand Unified Theories

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Extra-dimensions are a very interesting tool to address various missing parts of the Standard Model of particle physics. When one extra-dimension is added, a compactification based on a orbifold is required to ensure a chiral spectrum for the fermions. It also allows mechanisms to consistently break the bulk gauge group. Symmetry breaking on orbifolds can be understood in two different ways: through the boundary conditions imposed on the fields by the orbifold structure or through the vacuum structure of the fifth component of the gauge fields, the "gauge-scalar". We will use those mechanisms to build consistent 5D GUTs. We will focus on theories featuring an asymptotic behaviour for the running of the gauge couplings, dubbed asymptotic GUTs (aGUTs).

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