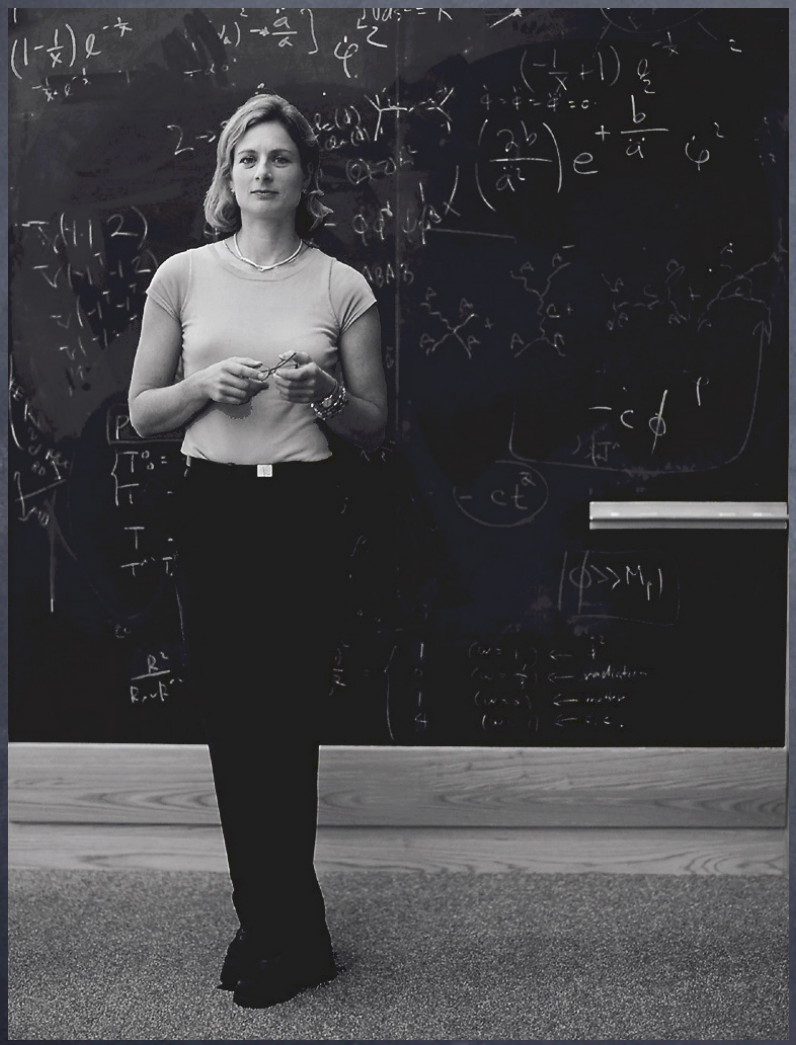
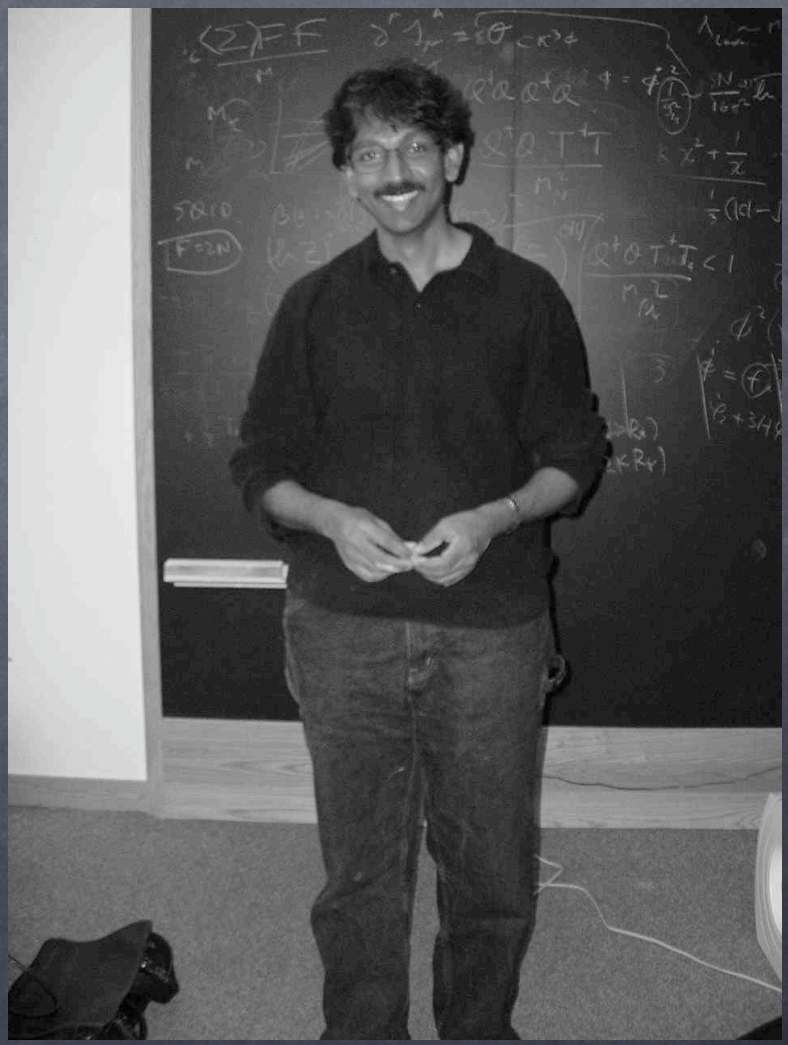
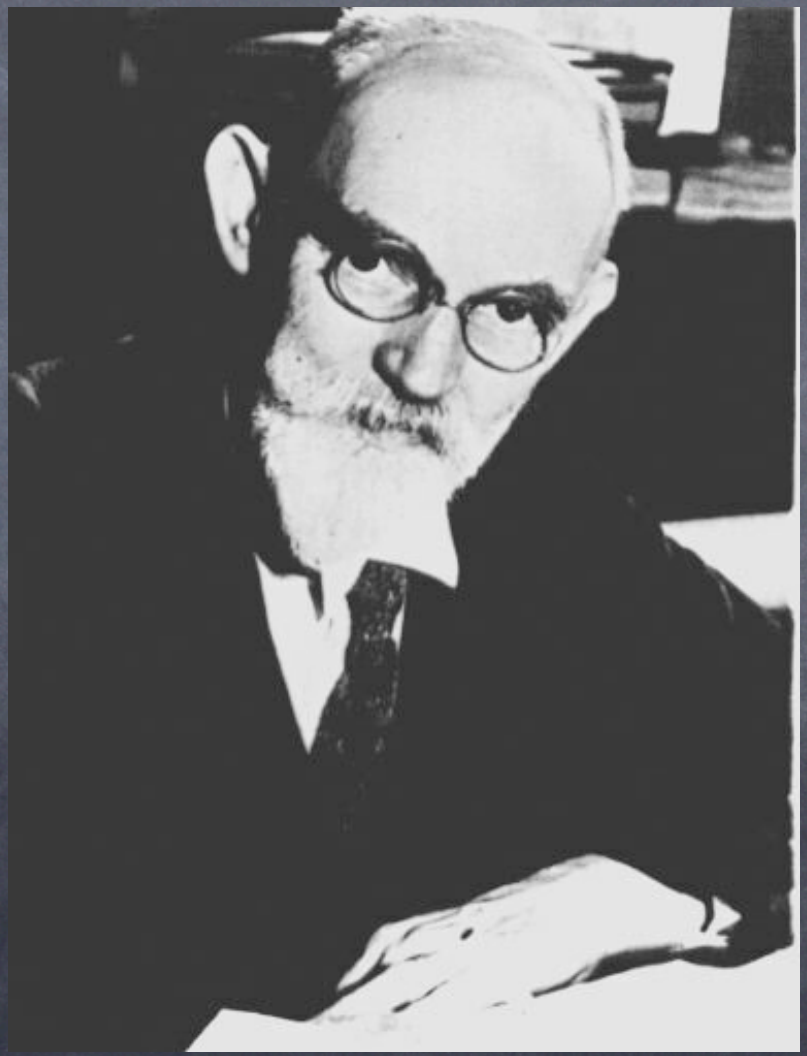
Chapter 20: Warped Extra Dimensions

Randall-Sundrum



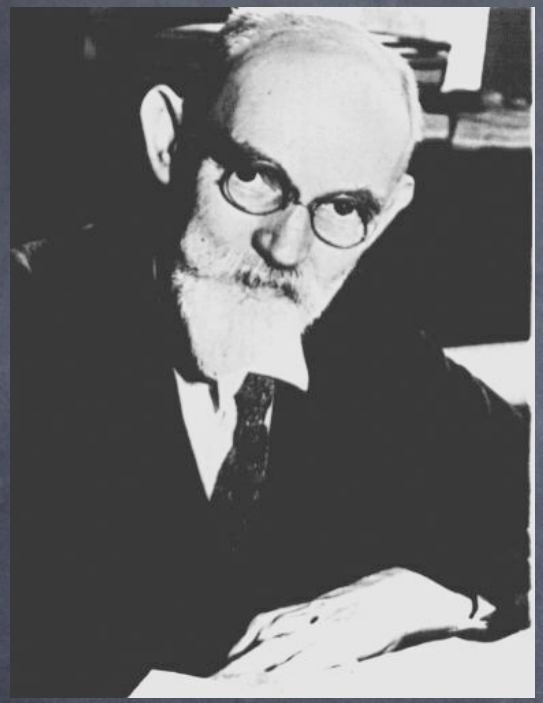


de Sitter

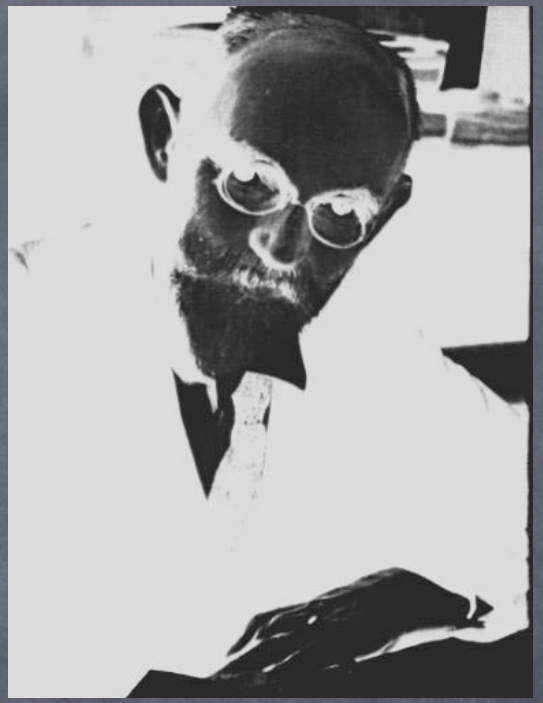


positive
cosmological
constant

de Sitter vs Anti-de Sitter

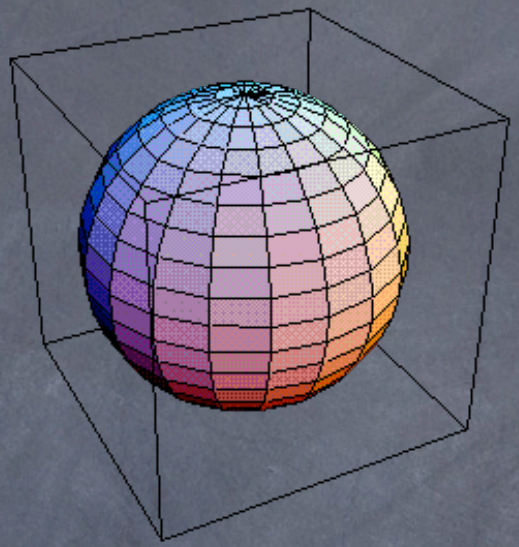


positive
cosmological
constant



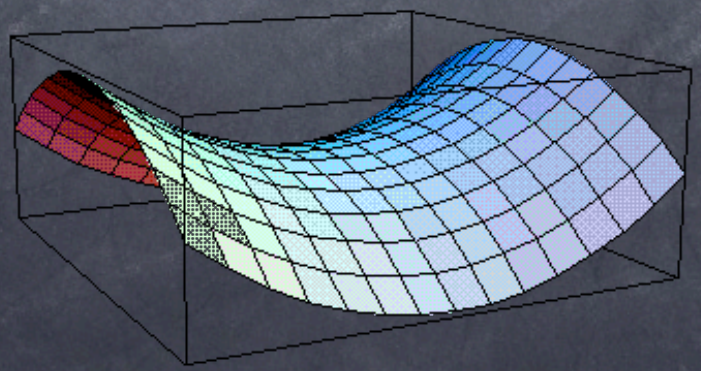
negative
cosmological
constant

Sphere



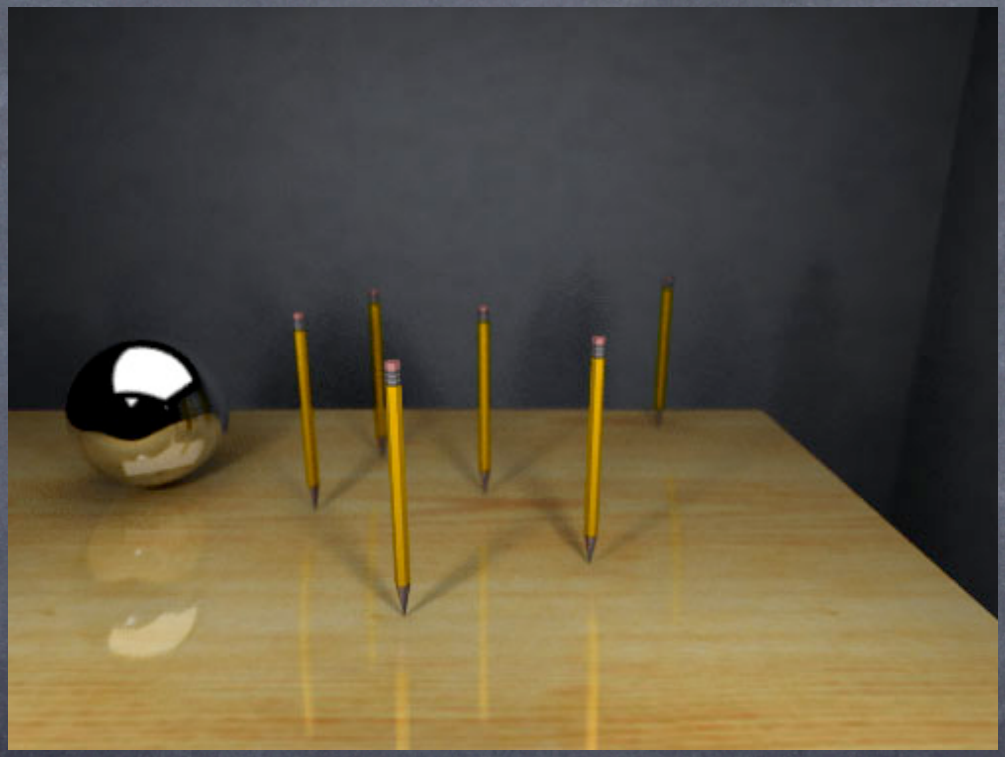
positive
curvature

Anti-de Sitter



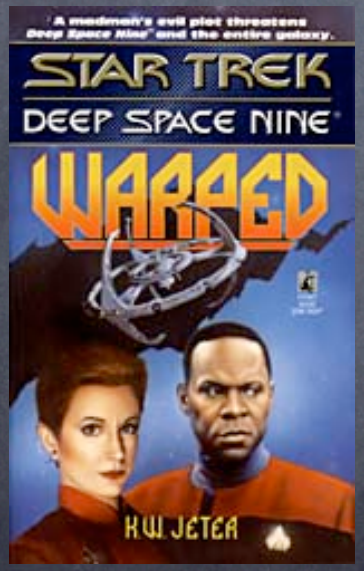
negative
curvature

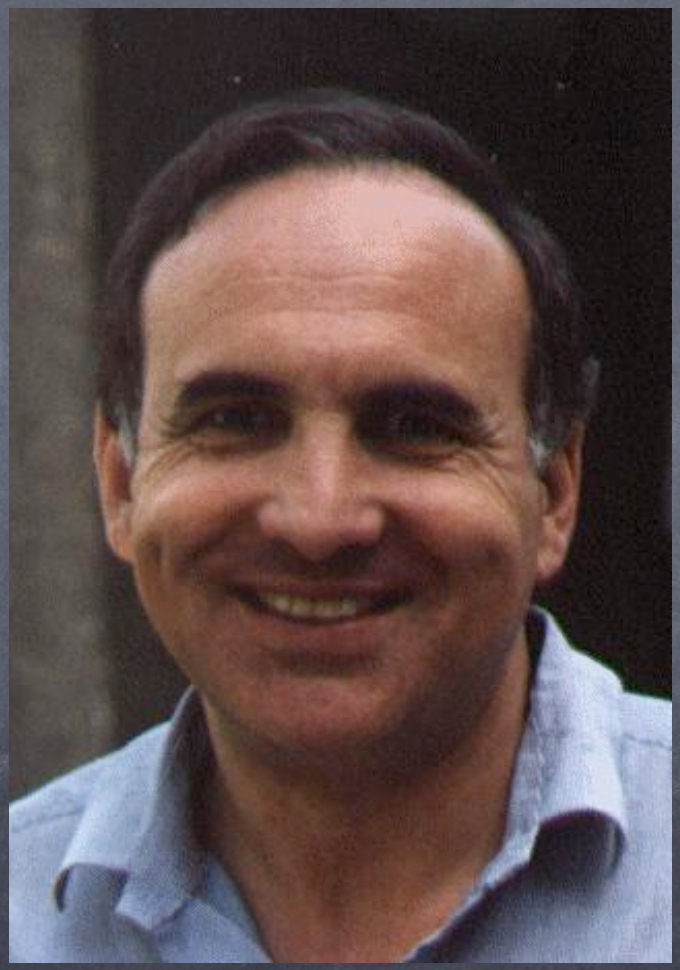
Fine Tuning Λ



$$\Lambda_{4D} = \Lambda_{5D} + \Lambda_{brane} + \Lambda_{brane} \approx 0$$

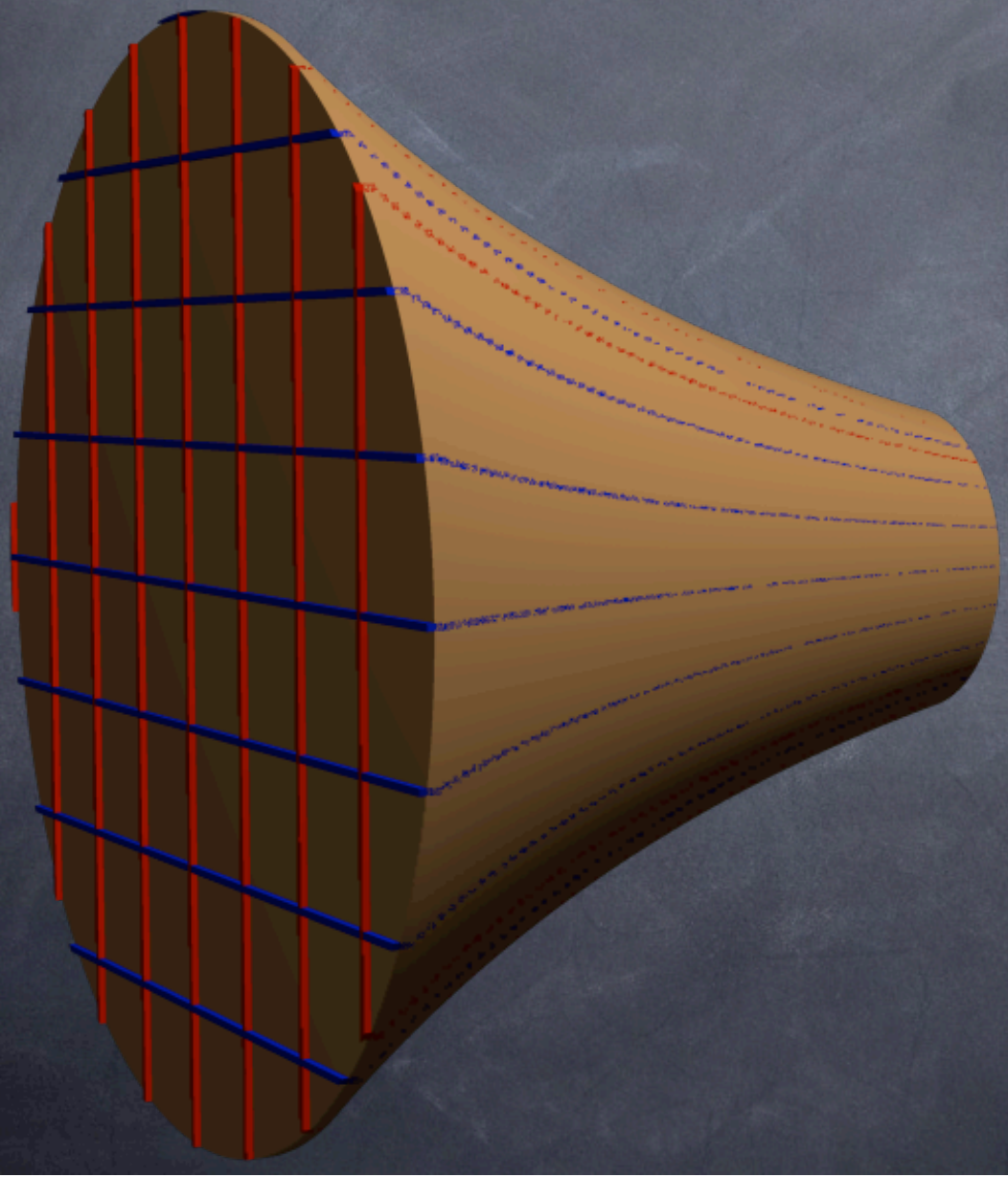
Tom Banks


A madman's evil plot threatens Deep Space Nine and the entire galaxy.
STAR TREK
DEEP SPACE NINE
WARPED
K.W. JETER

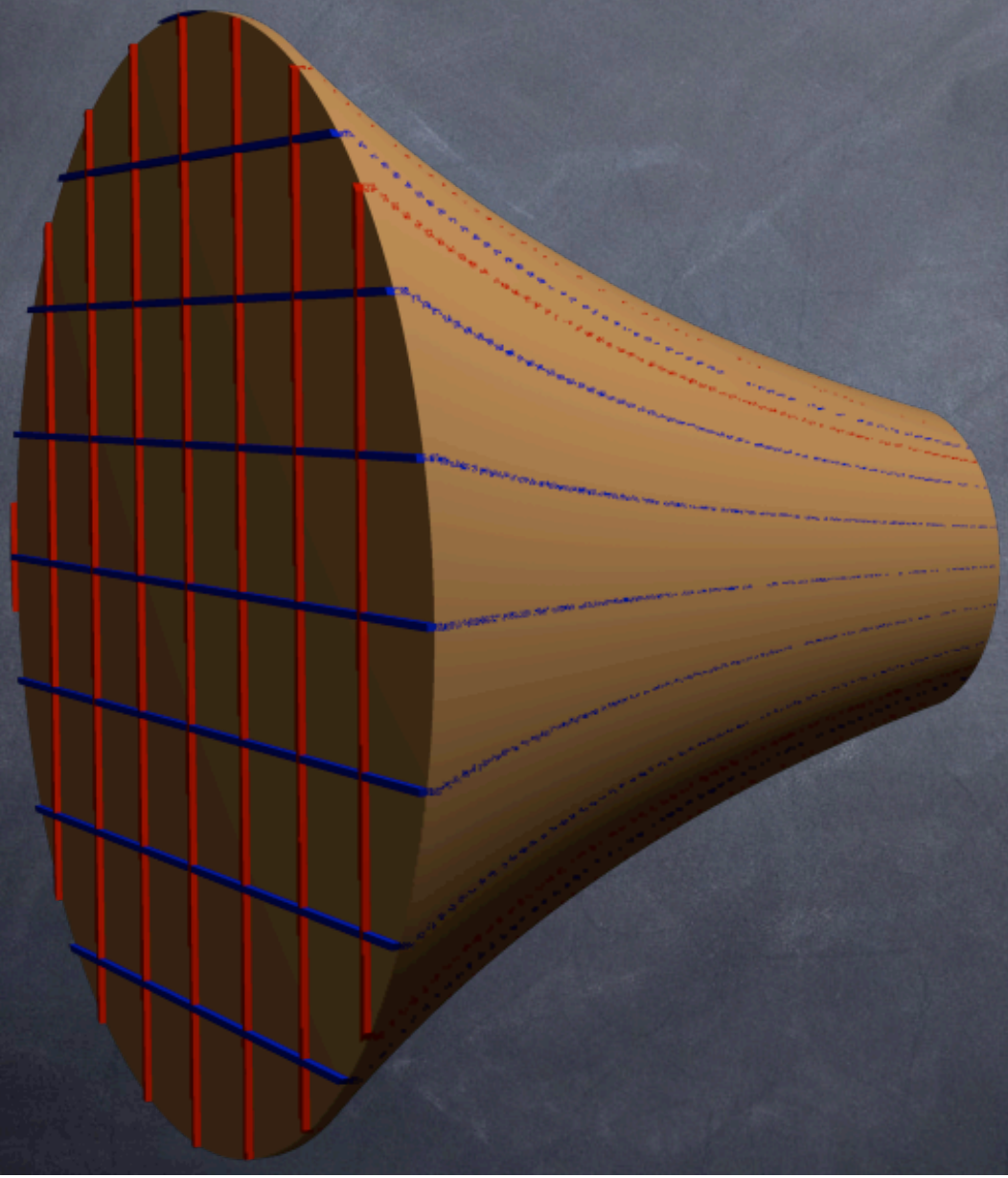


WATTIS INSTITUTE
WARPED SPACE

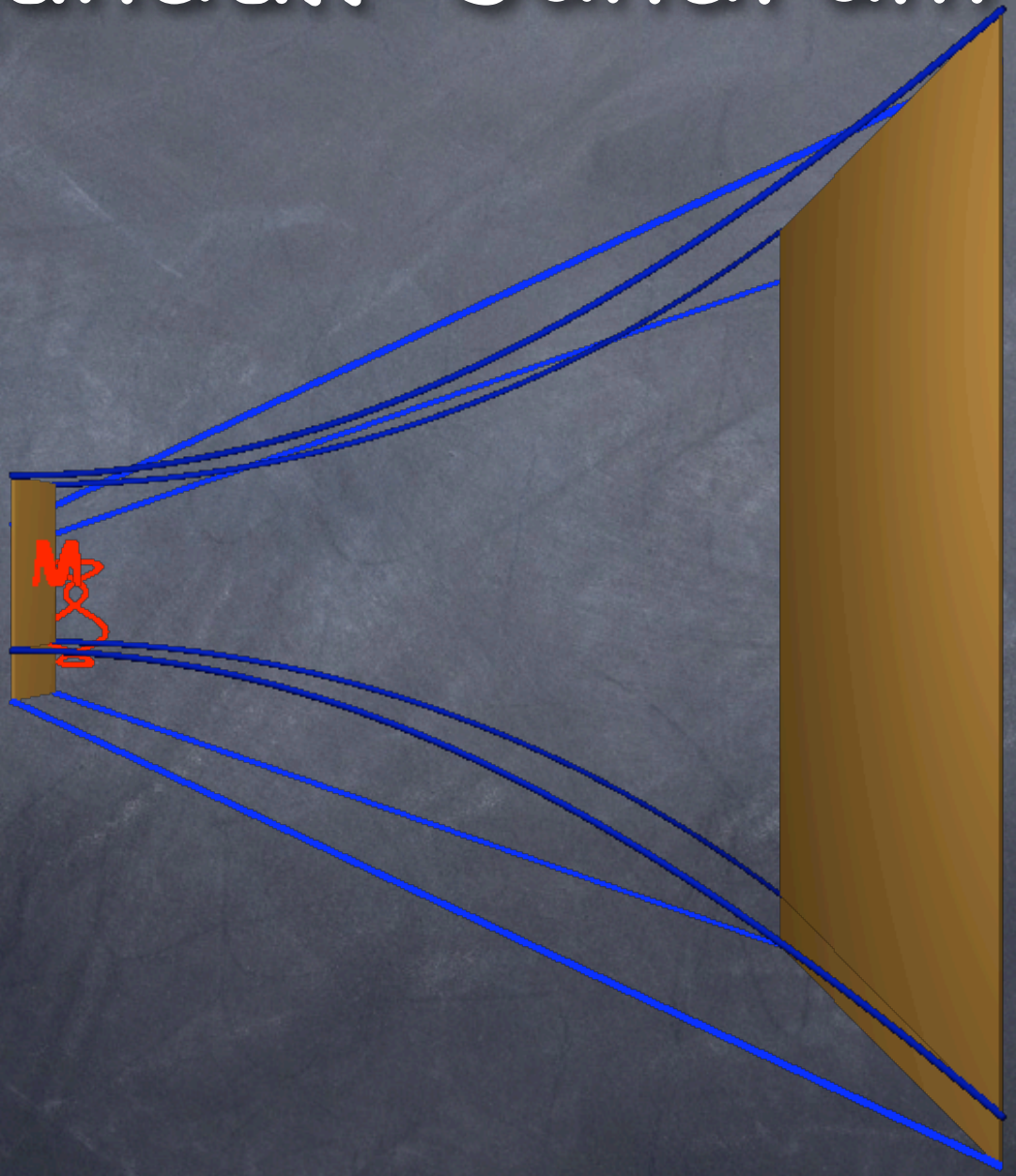
Warped Space



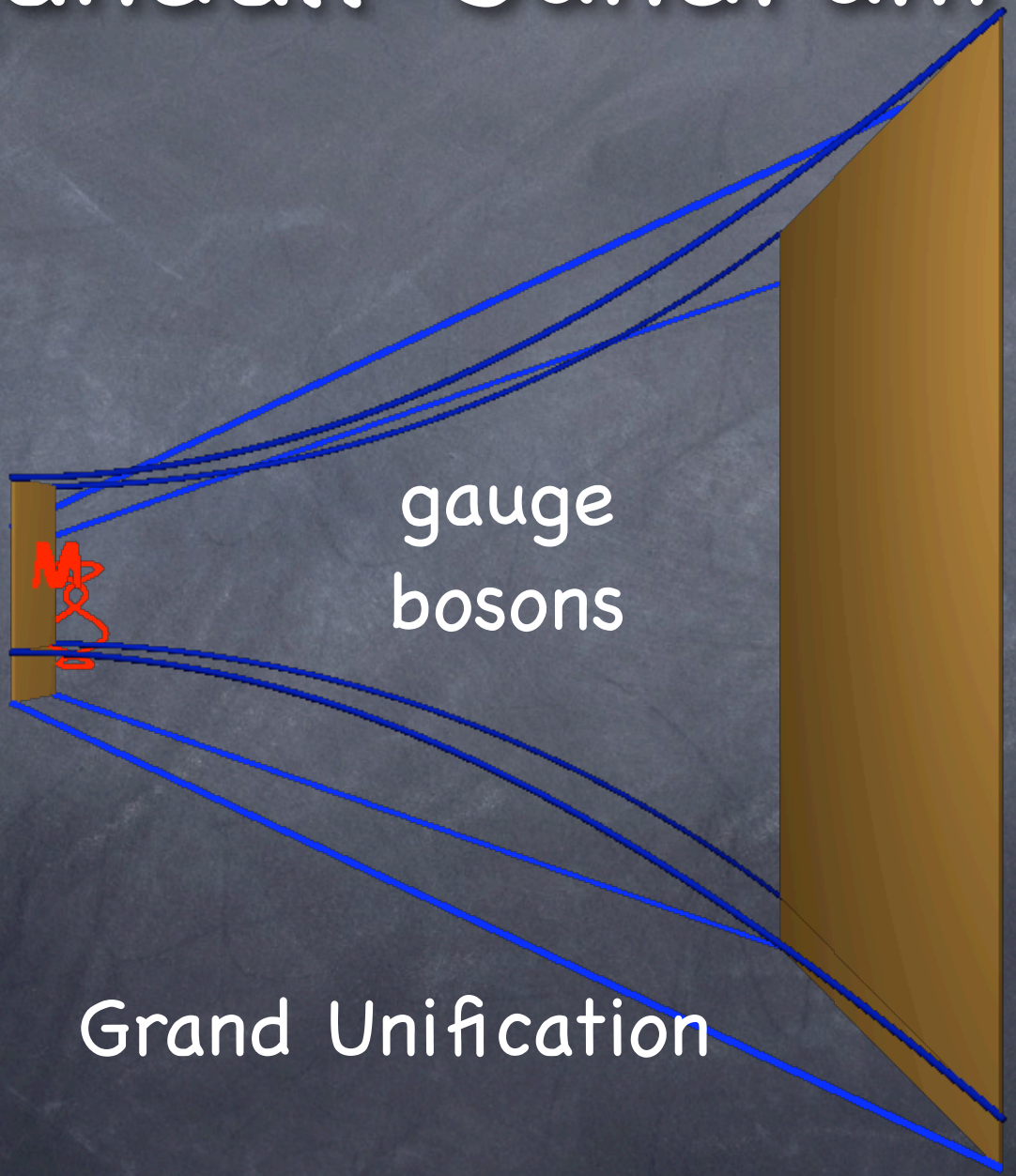
Warped Space



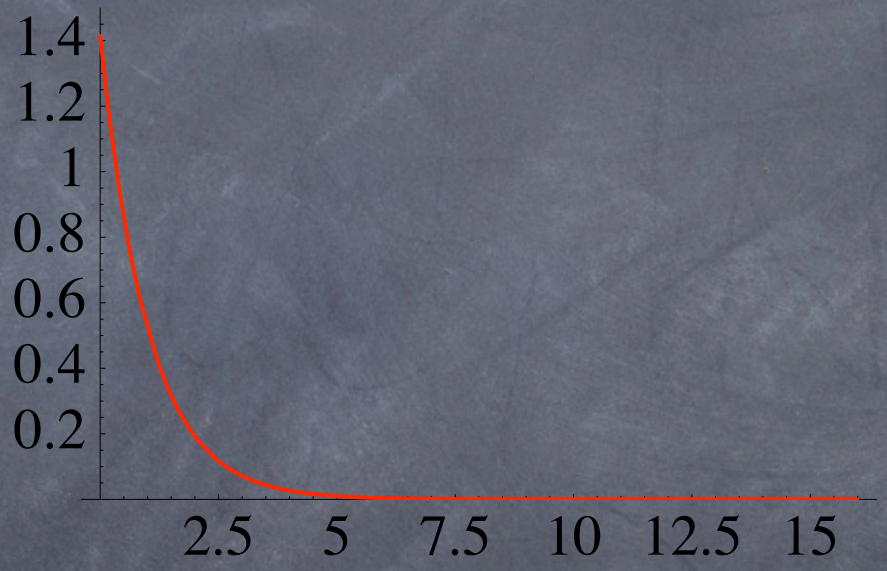
Randall-Sundrum



Randall-Sundrum



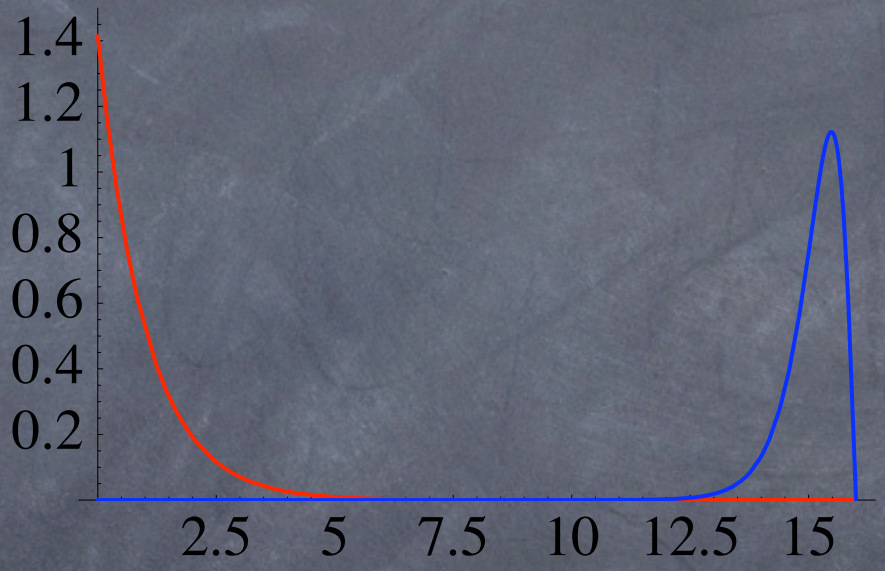
Graviton Probability



Gravity brane

Weak brane

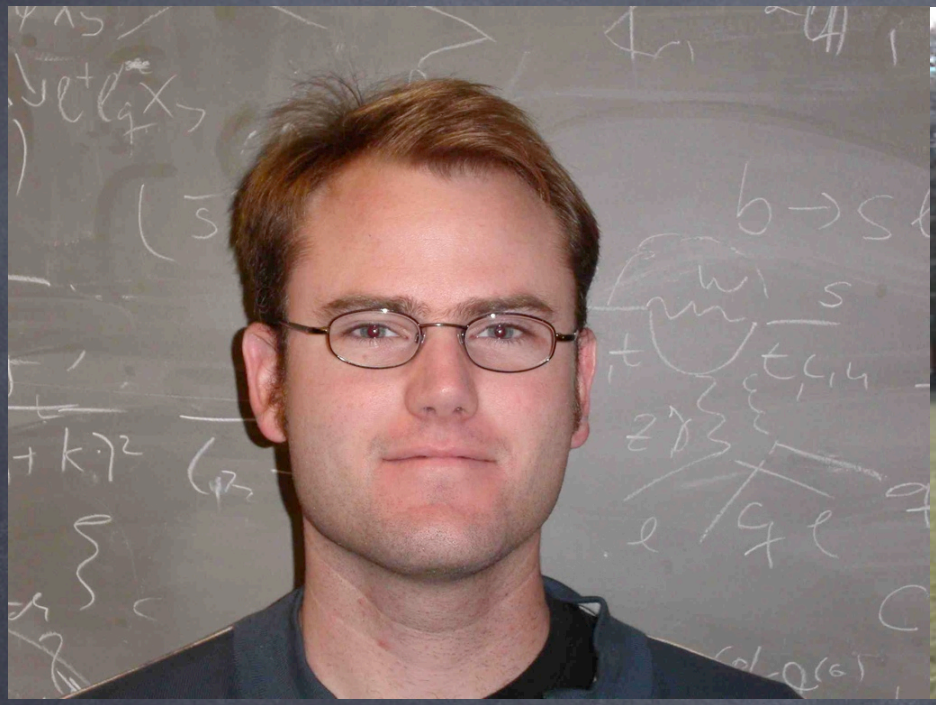
KK Graviton Probability



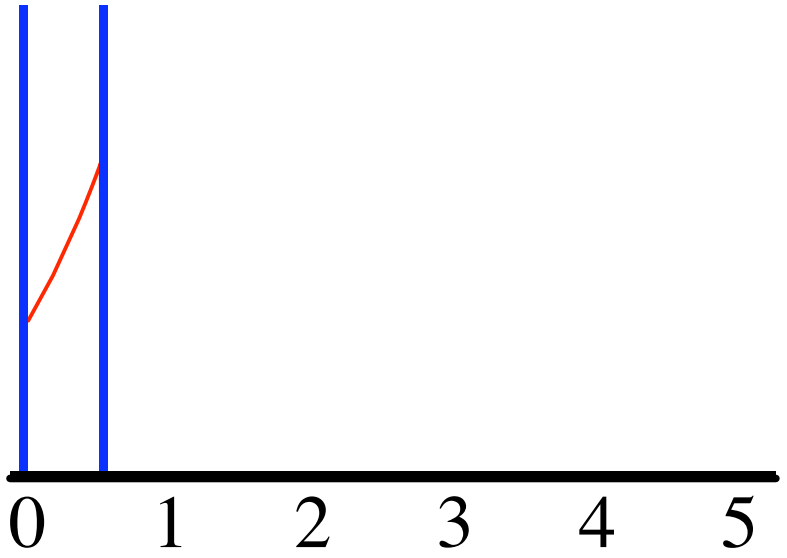
Gravity brane

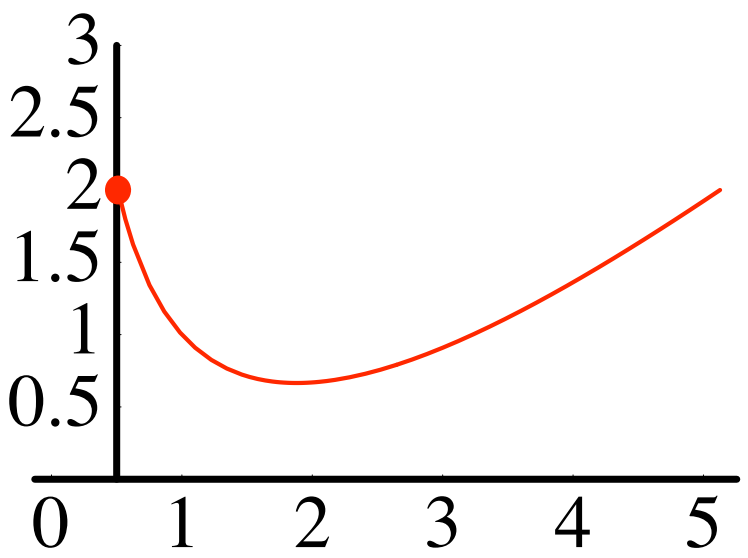
Weak brane

Goldberger, Wise

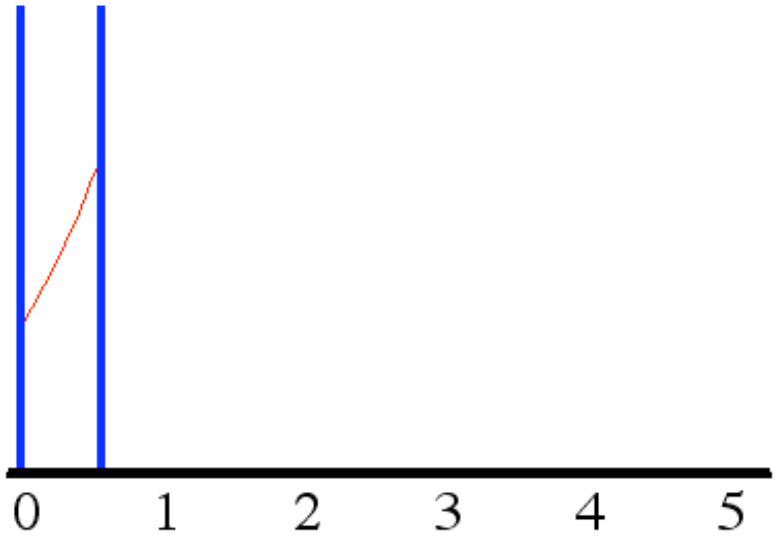


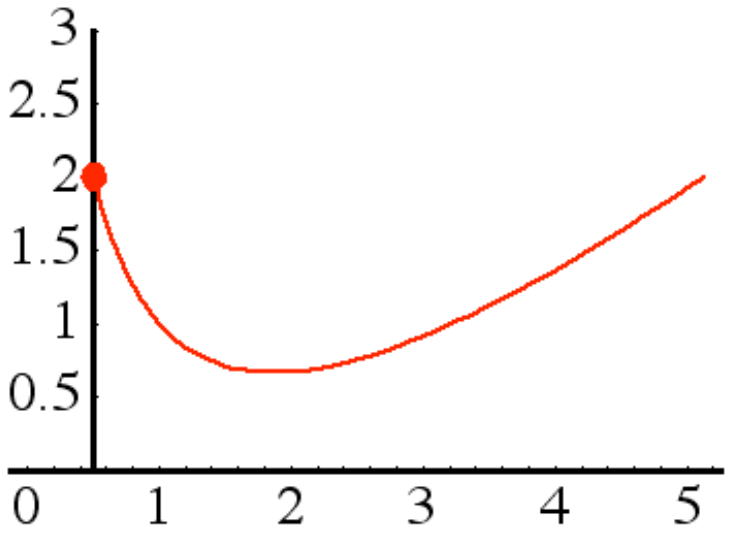
Goldberger, Wise



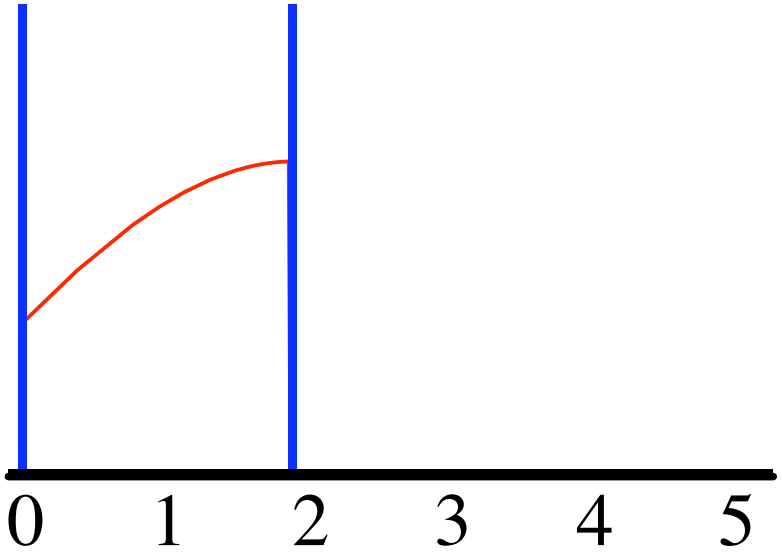


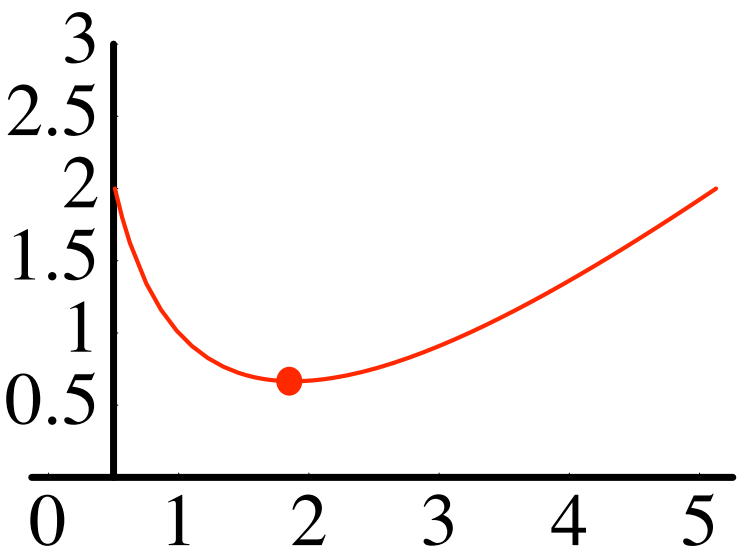
Goldberger, Wise



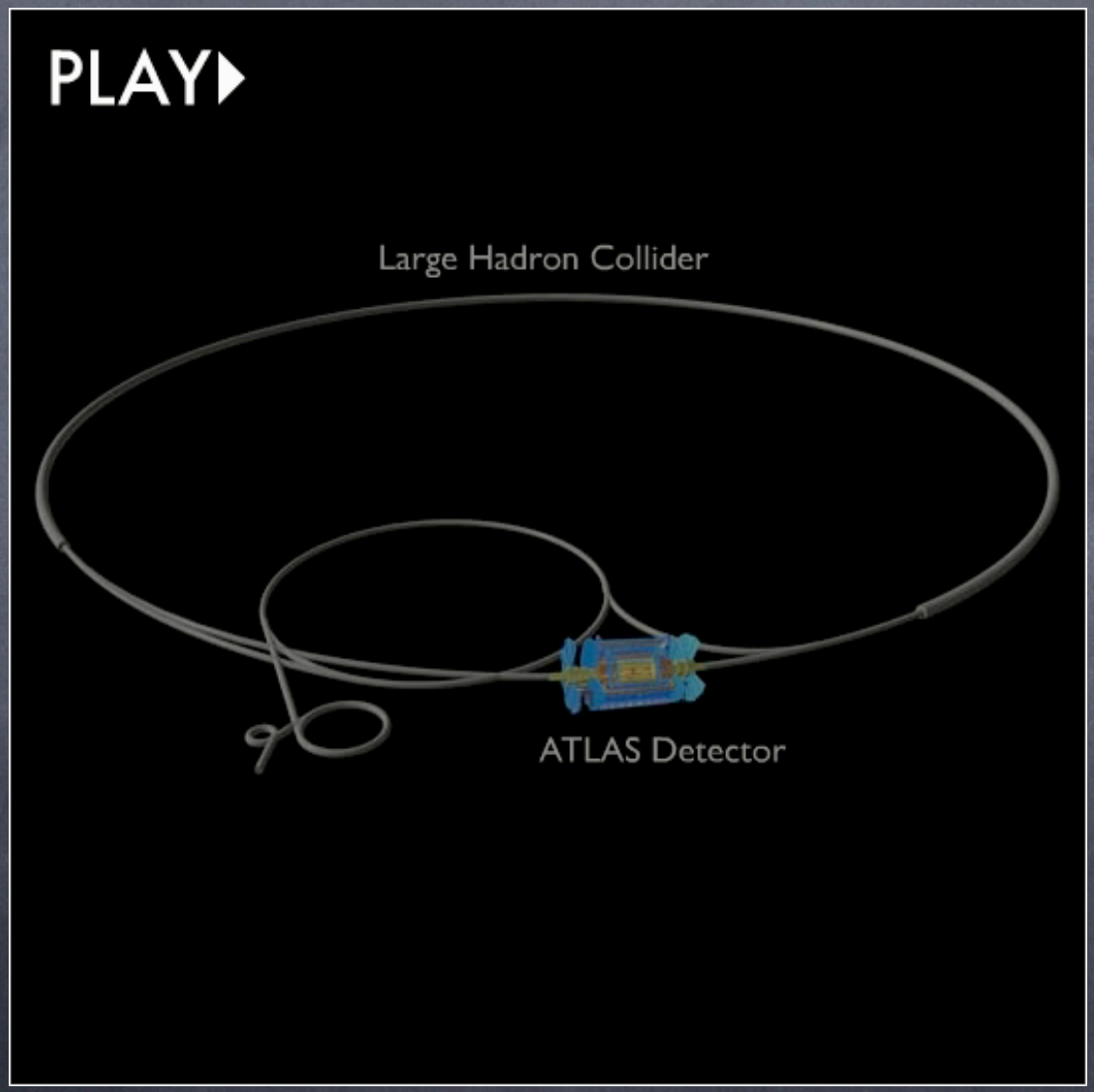


Goldberger, Wise

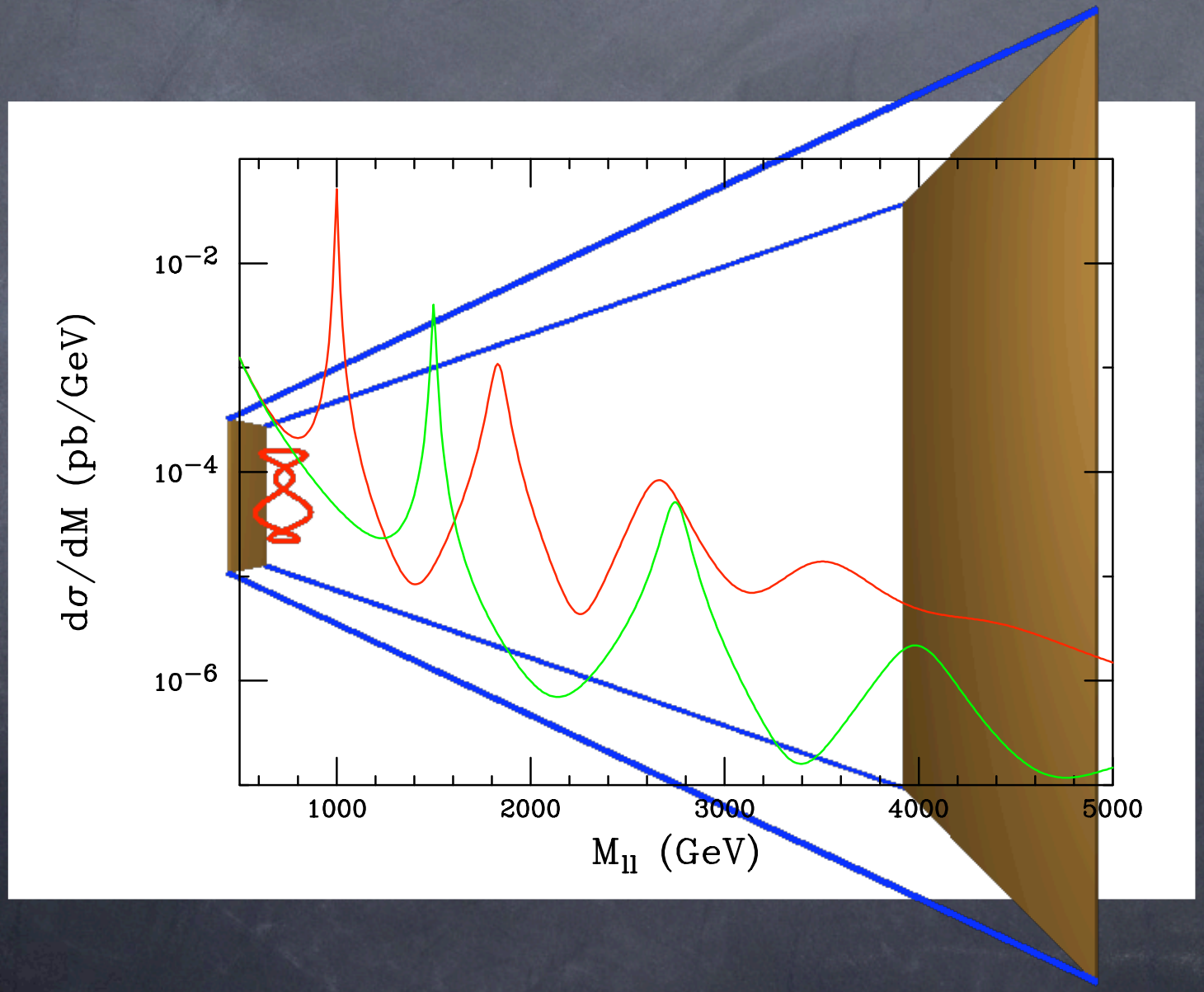




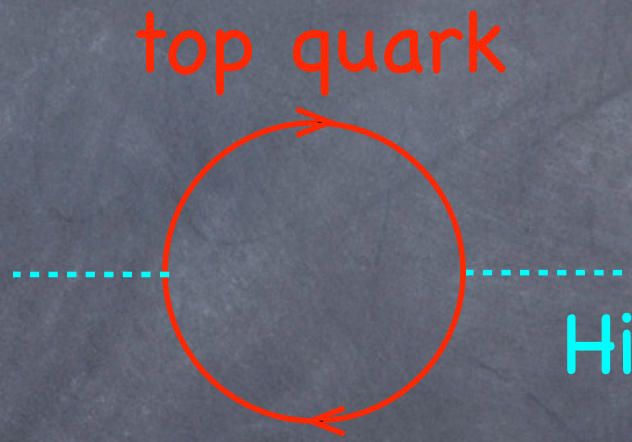
Detection at LHC



Graviton KK modes at LHC



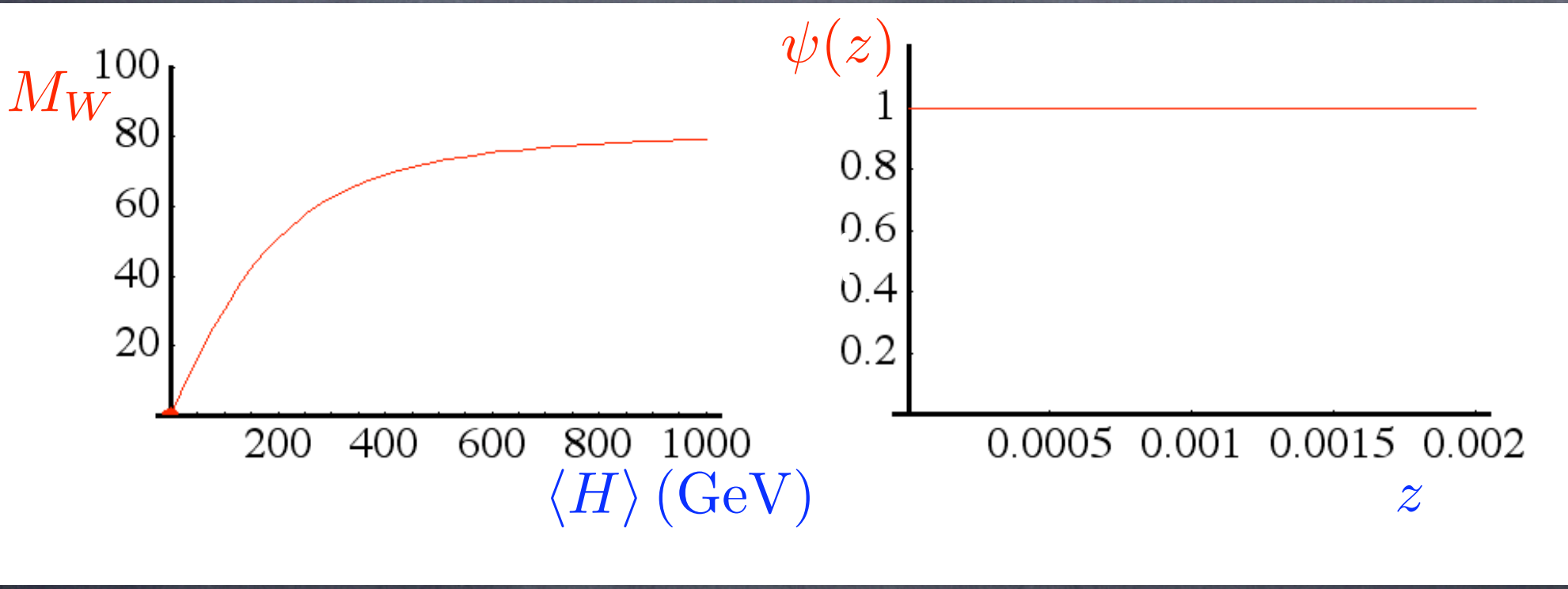
Hierarchy Problem



Max Energy on brane = M_{weak}

$$M_{Higgs} < M_{weak}$$

Higgs on a Boundary

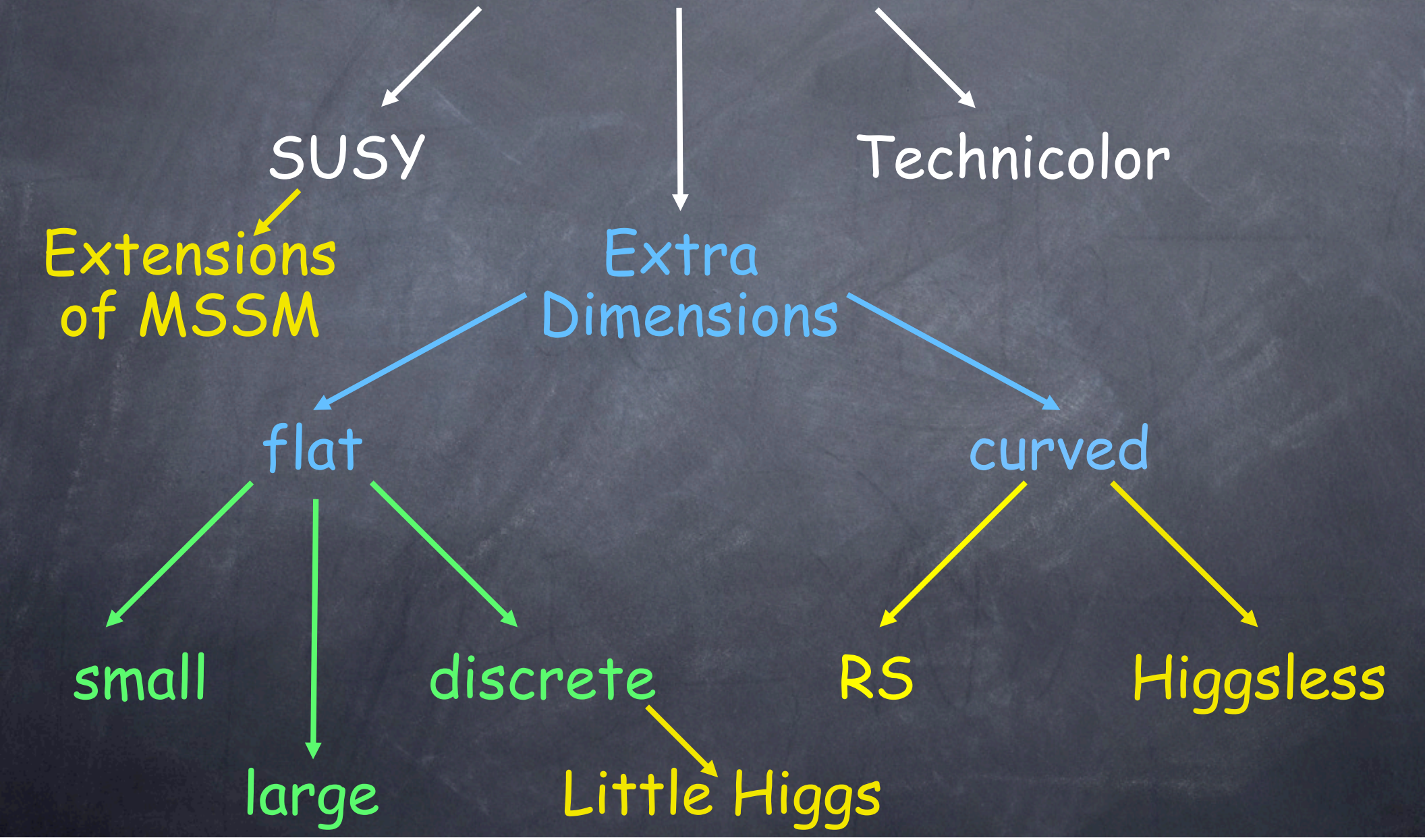


M_W is insulated from divergences

Going Higgsless

Gauge bosons

Weak Planck

Z boson mass = 90 protons

Hierarchy Problem Now