Minimal Composite Higgs Model

Like QCD: (techni)quarks, strong dynamics, global symmetry

New "quarks"

M_{PL}

Hierarchy

Global symmetry

$G = SO(5)$ 10

dynamically generated

f=TeV

Composite states
(incl. scalars)

$H = SO(4)$ 6

Kaplan,Georgi,Dimopoulos,Dugan,Galison '84; Agashe,Contino,DaRold,Pomarol '05 -'07

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composite Goldstone bosons = Higgs doublet

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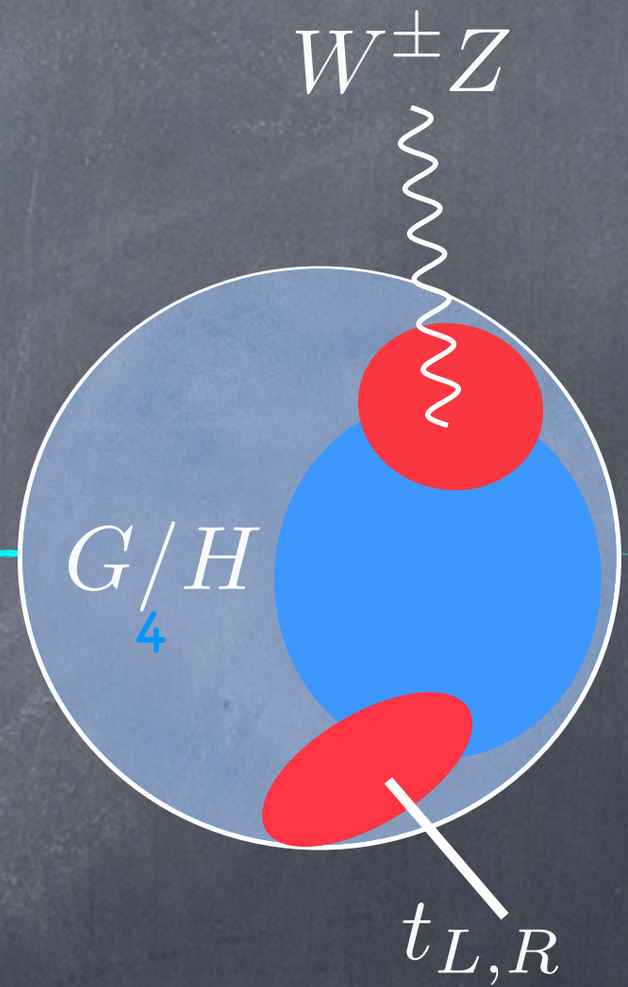

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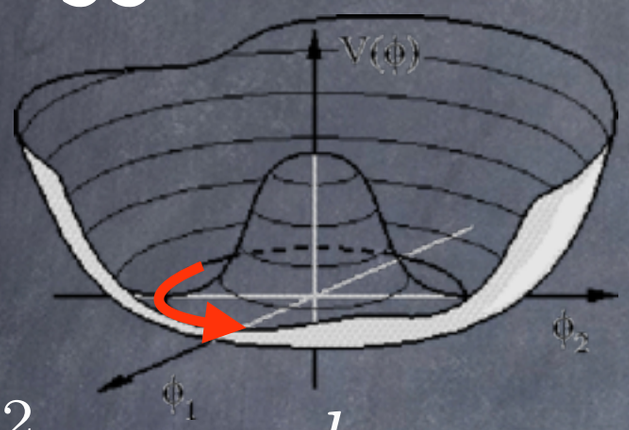
NGBHiggs couplings to SM fields

Higgs = Goldstone Boson of SO(5)/SO(4)



described by angular variable $\sin \frac{h}{f}$

$$\frac{g^2}{4} f^2 \sin^2 \frac{h}{f} W_\mu W^\mu =$$

Giudice,Grojean,Pomarol,Rattazzi '07;Barbieri,Bellazzini,Rychkov,Varagnolo'07; Pomarol,FR,'12;

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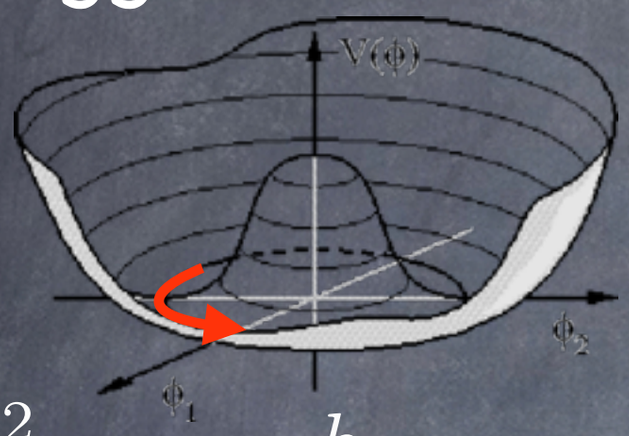

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$$\frac{g^2}{4}f^2\sin^2\frac{h}{f}W_\mu W^\mu \overset{h\to\langle h\rangle+h}{=} \frac{g^2}{4}f^2\sin\frac{\langle h\rangle}{f}^2 v^2 W_\mu W^\mu$$

$$+\frac{g^2}{2}f\sin\frac{\langle h\rangle}{f}\sqrt{1-\sin^2\frac{\langle h\rangle}{f}}\;hW_\mu W^\mu+..$$

$$c_V=\sqrt{1-\frac{v^2}{f^2}}$$

Model Independent

Giudice,Grojean,Pomarol,Rattazzi '07;Barbieri,Bellazzini,Rychkov,Varagnolo'07; Pomarol,FR,'12;

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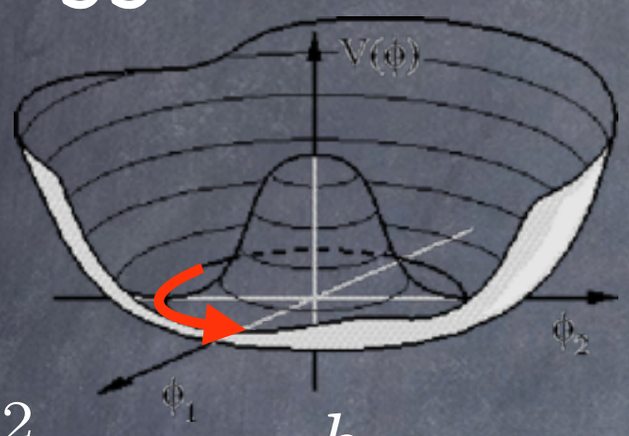

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$$c_V = \sqrt{1-\frac{v^2}{f^2}}$$

$$c_f = \frac{1+2m-(1+2m+n)v^2/f^2}{\sqrt{1-v^2/f^2}}$$

Model Independent

Model Dependent $m_t \sim \sin^{2m+1}\left(\frac{h}{f}\right)\cos^n\left(\frac{h}{f}\right)$

Giudice,Grojean,Pomarol,Rattazzi '07;Barbieri,Bellazzini,Rychkov,Varagnolo'07; Pomarol,FR,'12;