

Quasilocalization in high-energy collisions

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(5+n)-dimensional vector field action

$$S = \int \prod_{i=1}^n \frac{d\theta_i}{2\pi R_i} d^4x dz \sqrt{g} \left(-\frac{1}{4} F_{AB} F_{MN} g^{AM} g^{BN} \right) \quad (1)$$

Shaposhnikov-Gherghetta metric

$$ds^2 = a^2(z) (\eta_{\mu\nu} dx^\mu dx^\nu - \delta_{ij} d\theta^i d\theta^j) - dz^2 \quad (2)$$

θ_i are compact warped extra-dimensions ($\theta_i \in [0, 2\pi R_i]$, $i = \overline{1, n}$),

$a(z)$ is the Randall-Sundrum warp-factor $a = e^{-k|z|}$.

$$A^0(z) = \sqrt{\frac{2}{kn}} \quad \text{constant zero mode}$$

$$\int dz a^n \quad - \text{overlap integral is finite}$$

Charge universality

$$S_{int} = \int d^4x \int dz a^{4+n} e_5 A^0(z) \psi^{0*}(z) \psi^0(z) \bar{\psi}(x) \gamma^\mu \psi(x) A_\mu(x)$$

$$e_5 = e \sqrt{\frac{2}{kn}} \quad 5 \text{ - dimensional electric charge}$$

$$S_{int} = \int d^4x dz \sqrt{g} \delta(z) e_5 A_\mu(x, z) \bar{\psi}(x) \gamma^\mu \psi(x)$$

High-energy cross-section

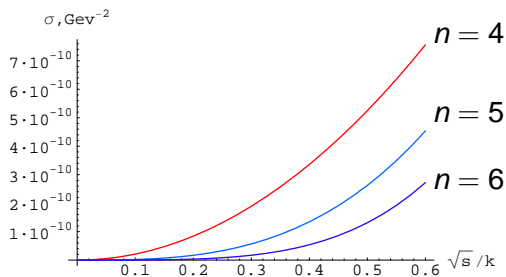


Figure: $\sigma(f\bar{f} \rightarrow \gamma' \rightarrow \text{add.} - \text{dim.})$ as a function of \sqrt{s}/k , ($k=10$ TeV)

$$\sigma(f\bar{f} \rightarrow \gamma' \rightarrow \text{add.-dim.}) = \frac{3}{4} \cdot \pi \cdot e^2 \cdot \frac{1}{k^2} \cdot \frac{1}{\Gamma^2(\frac{n}{2} + 1)} \cdot \left(\frac{\sqrt{s}}{2k}\right)^{n-2}$$
$$\frac{\sqrt{s}}{k} \ll 1$$

$\Upsilon(1S) \rightarrow \gamma' \rightarrow \text{add.dim.}$

$$\frac{Br(\Upsilon(1S) \rightarrow \gamma' \rightarrow \text{add.dim.})}{Br(\Upsilon(1S) \rightarrow \mu^+ \mu^-)} = \frac{\sigma(b\bar{b} \rightarrow \gamma' \rightarrow \text{add.dim.})}{\sigma(b\bar{b} \rightarrow \mu^+ \mu^-)} \quad (3)$$

$$Br(\Upsilon(1S) \rightarrow \text{nothing}) < 2,48 \cdot 10^{-2}$$

- 1) $n = 1, \quad k > 110 \text{ TeV};$
- 2) $n = 2, \quad k > 655 \text{ GeV};$
- 3) $n = 3, \quad k > 106 \text{ GeV}.$

$(o - Ps) \rightarrow \gamma' \rightarrow \text{add.dim.}$

$$\frac{Br(o - Ps \rightarrow \gamma' \rightarrow \text{add.dim.})}{Br(o - Ps \rightarrow 3\gamma)} = \frac{\sigma(e^+ e^- \rightarrow \gamma' \rightarrow \text{add.dim.})}{\sigma(e^+ e^- \rightarrow 3\gamma)} \quad (4)$$

$$Br(o - Ps \rightarrow \text{nothing}) < 2,8 \cdot 10^{-3}$$

1) $n = 1, \quad k > 114 \text{ TeV};$

2) $n = 2, \quad k > 6 \text{ GeV};$

3) $n = 3, \quad k > 0,2 \text{ GeV}.$

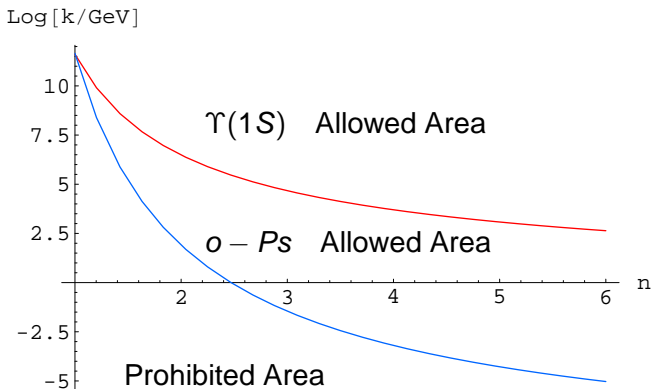


Figure: Experimental constraint on parameters k and n

**Thank you for your
attention!**