Which new physics can be probed in $a^{\gamma\gamma}$?

- Loops of spin 0,1/2, 1 new particles contribute to $a^{\gamma\gamma}$. Because all vertices are fixed by gauge invariance, one can compute contributions in a generic way.

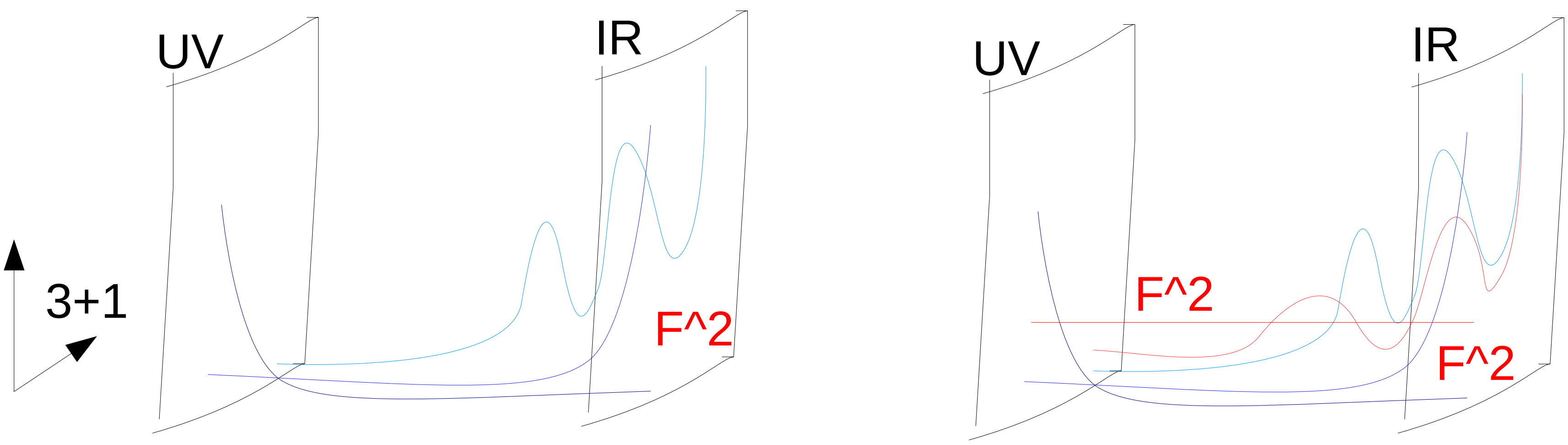
➡ Unless having large quantum numbers and/or multiplicity, these contributions are too small given AFP expected sensitivity (SM-like : ~10^-6-10^-5/ m^4)

- Gravity couples to the gauge EM tensor ~ F^2. It contributes at tree-level to $a^{\gamma\gamma}$.

- WED models contain KK gravitons (spin 2) and a radion (spin 0). We consider a general WED framework with pure AdS5 metric.

- By AdS/CFT duality, this framework also describes composite Higgs models at large N. The KK modes are composite resonances. The radion is the dilaton of the spontaneously broken CFT.

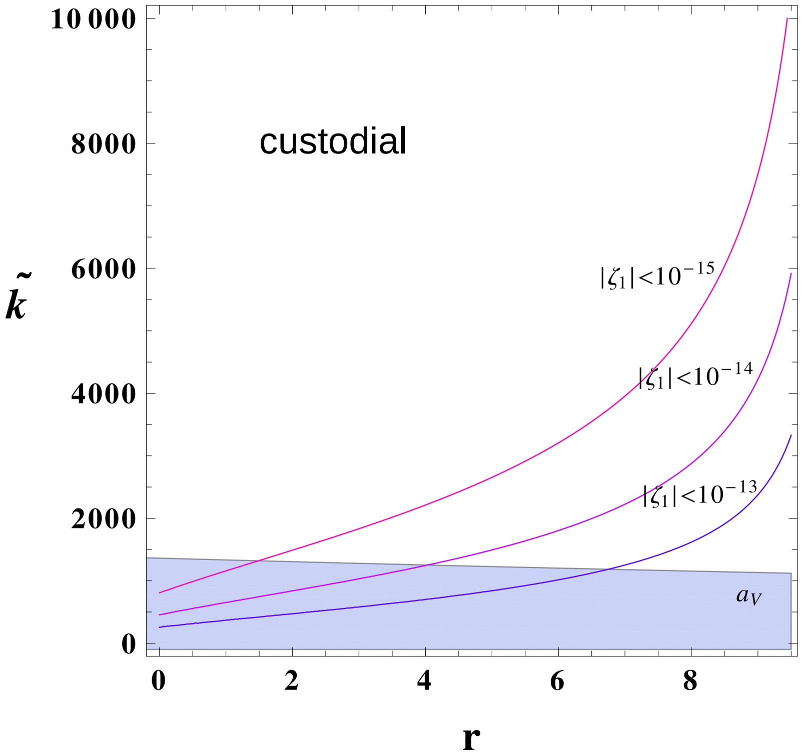
The WED framework (part relevant for $a^{\gamma\gamma}$)

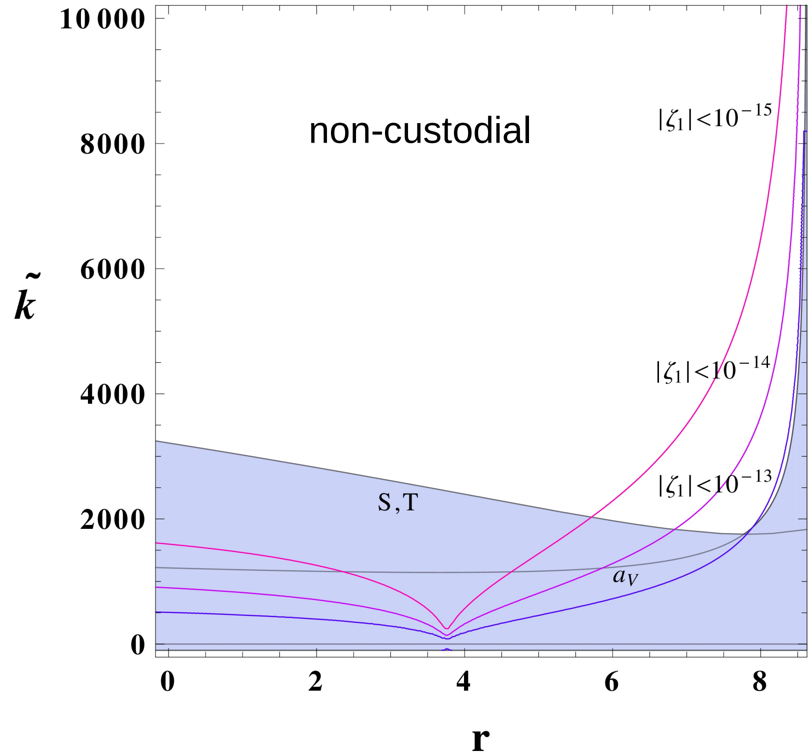


- KK modes and radion are always localized near the IR brane
- Gauge fields can be either on the IR brane or in the bulk with IR brane kinetic terms
- BKTs can both alleviate EW and Higgs precision constraints AND pump up $a^{\gamma\gamma}$
- AdS5 parameters : κ (O(1) parameter) and $\tilde{k}$ (KK scale) .
  SU(2)xU(1) BKTs : r, r'

- For the brane gauge fields scenario, we get $a_1^{\gamma\gamma} \sim 3.3\,\kappa^2/m_{\mathbf{2}}^4$
- For $\kappa = 2$, KK gravitons up to ~ 3.4 (6.0) TeV can be seen for sensitivity of 10^-13 (10^-14) GeV^-4

- For the bulk gauge field scenario, (note $m_{\mathbf{2}} = 3.8\tilde{k}$)





- The radion contribution in the EFT is small. But one could observe a light radion directly as a resonance.