Holographic Weyl anomaly in 8d

from general higher curvature gravity

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Holographic applications：from Quantum Realms to the Big Bang

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Weyl anomaly in CFT

Conformal invariance of classical CFT

$$g_{ab} \to g'_{ab} = \Omega^2 g_{ab}, \qquad \delta_\sigma g_{ab} = 2\sigma g_{ab}, \qquad \delta_\sigma S[g_{ab}, \phi_i] = 0.$$

In quantum theory, the partition function and effective action

$$Z[g_{ab}] = \int \mathscr{D}\phi_i e^{-S[g_{ab},\phi_i]}, \qquad W[g_{ab}] = -\ln Z[g_{ab}] \overset{\text{cls.}}{\approx} S[g_{ab}, \phi_i^{(\text{cls})}]$$

In even dimensions and curved background, we have Weyl (trace) anomaly

$$\delta_\sigma W[g_{ab}] = \int \mathrm{d}^d x \sqrt{|g|}\, \sigma \mathscr{A} = \int \mathrm{d}^d x \sqrt{|g|} \left\langle T^a_a \right\rangle \sigma, \implies \left\langle T^a_a \right\rangle = \mathscr{A} + \nabla_a J^a$$

Structure of Weyl anomaly: central charges

Introduction of a-charge and c-charges

$$(4\pi)^{d/2}\left\langle T_a^a \right\rangle = -aE^{(d)} + \sum_i c_i I_i^{(d)} + \nabla_a J^a$$

Where: $E^{(d)}$: Euler density (type A Weyl anomaly), $I_i^{(d)}$: Weyl invariants (type B).

Examples:

$$d = 2 : E^{(2)} = R,$$

$$d = 4 : E^{(4)} = R^2 - 4R_{ab}R^{ab} + R_{abcd}R^{abcd}, I^{(4)} = C_{abcd}C^{abcd}$$

$$d = 6 : E^{(6)} \sim R^3, I_1^{(6)} \sim C^3, I_2^{(6)} \sim C^3, I_3^{(6)} \sim R \Box R$$

Central charge and correlator

$$\left\langle T^{ab}(x)T^{cd}(y)\right\rangle = C_T\frac{\mathcal{I}^{abcd}(x-y)}{|x-y|^d}$$

$$\left\langle T^{ab}(x)T^{cd}(y)T^{ef}(z)\right\rangle = \frac{\mathcal{A}\mathcal{I}_1^{abcdef}+\mathcal{B}\mathcal{I}_2^{abcdef}+\mathcal{C}\mathcal{I}_3^{abcdef}}{|x-y|^d|y-z|^d|z-x|^d}$$

Energy flux parameters t_2, t_4, $(C_Tt_2, C_Tt_4, C_T) \sim (\mathcal{A}, \mathcal{B}, \mathcal{C})$

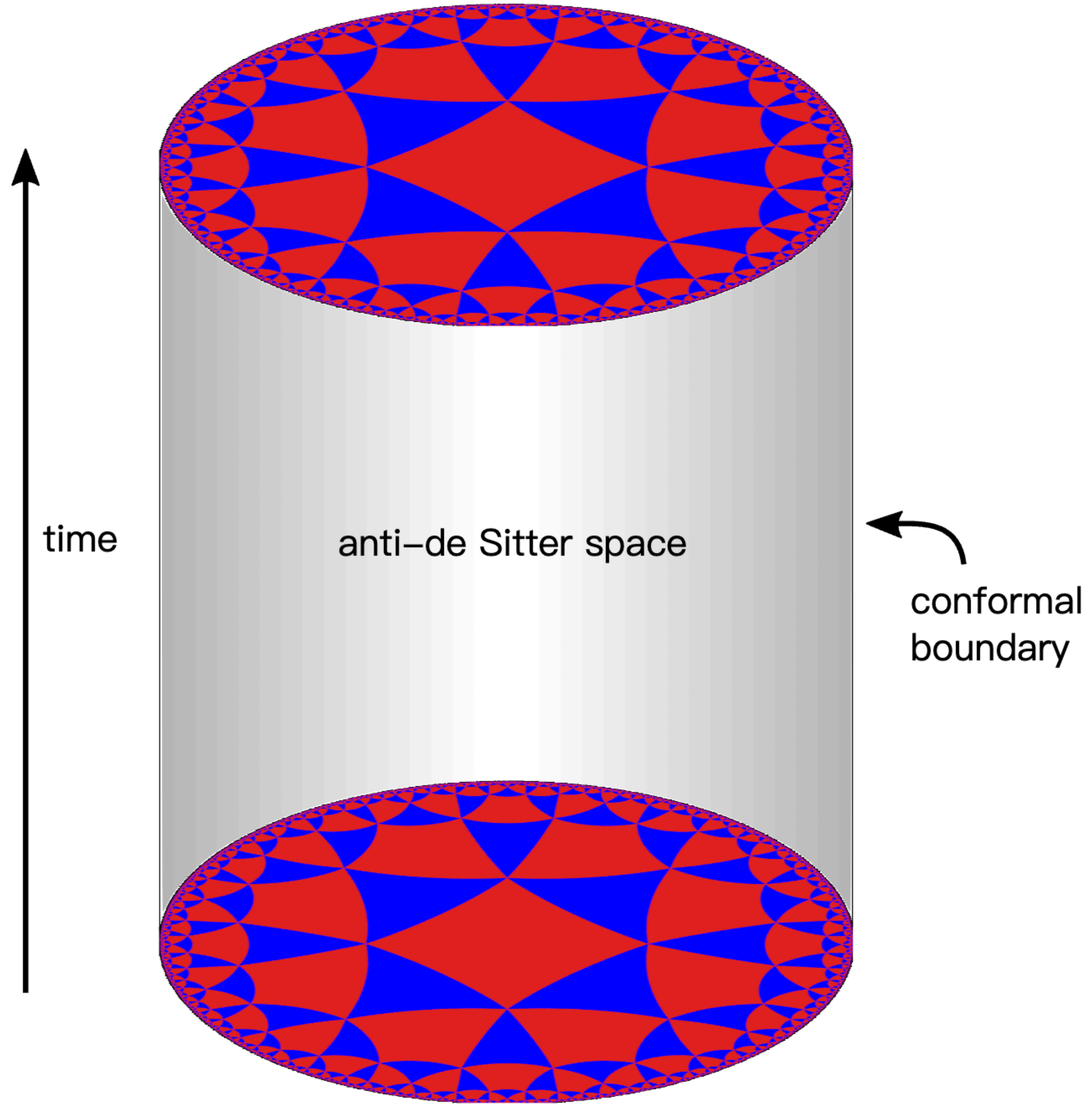
For $d = 4$:

$$c = \frac{\pi^4}{40}C_T$$

For $d = 6$:

$$c_3 = \frac{\pi^6}{3024}C_T$$

The AdS/CFT correspondence



Quantum gravity in AdS ↔ CFT on the boundary
(weakly coupled) (strongly coupled)

Boundary field $\phi_i(0,x)$ ↔ Source $J_i(x)$

Boundary metric ↔ Background metric

$$Z_{\mathrm{AdS}}[g_{ab}(0,x) = g_{ab}(x), \phi_i(0,x) = J_i(x)] = Z_{\mathrm{CFT}}[g_{ab}(x), J_i]$$

Holographic Weyl anomaly

Consider the FG expansion metric

$$\mathrm{d}s^2 = \frac{L^2}{4\rho^2}\mathrm{d}\rho^2 + \frac{1}{\rho}g_{ab}(z)\mathrm{d}x^a\mathrm{d}x^b \qquad g_{ab}(\rho) = g^{(0)}_{ab} + \rho g^{(1)}_{ab} + \cdots + \rho^{d/2}g^{(d/2)}_{ab} + \rho^{d/2}\ln\rho h^{(d/2)}_{ab} + \cdots$$

The bulk action takes the form (introduce cutoff $\rho > \epsilon$)

$$S_{\mathrm{AdS}} = \frac{L}{2}\int \mathrm{d}^d x\sqrt{|g^{(0)}|}\left(-\frac{2}{d}\epsilon^{-d/2}\mathscr{L}_0 + \cdots - \epsilon^{-1}\mathscr{L}_{d/2-1} - \ln\epsilon\mathscr{L}_{d/2}\right) + S^{\mathrm{reg}}_{\mathrm{AdS}}$$

Consider variation with $\delta g^{(0)}_{ab} = 2\sigma g^{(0)}_{ab}$, $\delta\epsilon = 2\sigma\epsilon$

$$0 = \delta S_{\mathrm{AdS}} = \delta S^{\mathrm{reg}}_{\mathrm{AdS}} - L\int \mathrm{d}^d x\sqrt{|g^{(0)}|}\,\sigma\mathscr{L}_{d/2} \implies \mathscr{A} = L\mathscr{L}_{d/2}$$

Example: Einstein gravity

Einstein-Hilbert action

$$S_{EH} = \frac{1}{16\pi G}(R - 2\Lambda) = \frac{1}{16\pi G}\left[R + \frac{d(d-1)}{L^2}\right]$$

For $d = 4$

$$\mathcal{L}_2 = \frac{L^2}{16\pi G}\left(-\frac{1}{12}R^2 + \frac{1}{4}R_{ab}R^{ab}\right) \implies a = c = \frac{L^3\pi}{8G} = \frac{\pi^4}{40}C_T$$

For $d = 6$

$$\mathcal{L}_3 = \frac{L^4}{16\pi G}\left(\frac{3}{1600}R^3 + \frac{3}{640}\nabla^a R\nabla_a R - \frac{1}{64}\nabla^c R^{ab}\nabla_c R_{ab} - \frac{1}{64}RR^{ab}R_{ab} + \frac{1}{32}R_{ac}R_{bd}R^{abcd}\right)$$

$$a = c_3 = \frac{\pi^2 L^5}{48G}, \qquad c_1 = -\frac{\pi^2 L^5}{16G}, c_2 = -\frac{\pi^2 L^5}{4G}$$

Higher curvature gravity

Lagrangian constructed from non-differentiated Riemann tensor

$$S = \int \mathrm{d}^D x \sqrt{|g|}\, \mathscr{L}(g_{\mu\nu}, R_{\mu\nu\rho\sigma})$$

e.g.:

Gauss-Bonnet: $\mathscr{L} = R - 2\Lambda + \lambda(R^2 - 4R_{\mu\nu}R^{\mu\nu} + R_{\mu\nu\rho\sigma}R^{\mu\nu\rho\sigma})$

General quadratic: $\mathscr{L} = R - 2\Lambda + \alpha_1 R^2 + \alpha_2 R_{\mu\nu}R^{\mu\nu} + \alpha_3 R_{\mu\nu\rho\sigma}R^{\mu\nu\rho\sigma}$

Non-polynomial example: $\mathscr{L} = R - 2\Lambda + e^{\alpha R_{\mu\nu}R^{\mu\nu}} + \tanh(\alpha_2 R_{\mu\nu\rho\sigma}R^{\mu\nu\rho\sigma})$

General higher curvature gravity (GHC)

The equation of motion

$$\mathscr{E}^{\mu\nu} = P^{\mu\rho\sigma\tau} R^{\nu}{}_{\rho\sigma\tau} - \frac{1}{2}\mathscr{L} g^{\mu\nu} - 2\nabla_\rho \nabla_\sigma P^{\mu\rho\sigma\nu}$$

Assuming MSS solution $\bar{R}_{\mu\nu\rho\sigma} = 2\lambda \bar{g}_{\mu[\rho}\bar{g}_{\sigma]\nu}$, (for AdS, $\lambda = -L^{-2}$)

$$\bar{\mathscr{E}}^{\mu\nu} = \bar{g}^{\mu\nu}\left[(D-1)\lambda k_{1,1} - \frac{1}{2}\bar{\mathscr{L}}\right] \quad \Longrightarrow \quad \bar{\mathscr{L}} = 2(D-1)\lambda k_{1,1}$$

Linearized theory around MSS has two extra modes

$$\mathscr{E}_L^{\mu\nu} \sim \frac{-1}{m_g^2 \kappa_{\text{eff}}}(\Box - 2\lambda)(\Box - 2\lambda - m_g^2) h^{\langle\mu\nu\rangle} - \frac{\#}{m_s^2} g^{\mu\nu}(\Box - m_s^2) h$$

$$m_g^2, m_s^2, \kappa_{\text{eff}} \sim k_{1,1}, k_{2,1}, k_{2,2}, k_{2,3}$$

The tensor P_n

Defining the tensors

$$P_n^{\mu_1\nu_1\rho_1\sigma_1\cdots\mu_n\nu_n\rho_n\sigma_n} = \frac{\partial^n \mathscr{L}}{\partial R_{\mu_1\nu_1\rho_1\sigma_1}\cdots\partial R_{\mu_n\nu_n\rho_n\sigma_n}}, \qquad P^{\mu\nu\rho\sigma} \equiv P_1^{\mu\nu\rho\sigma}$$

They are defined by the coefficient of $\delta^n \mathscr{L}$

$$\delta^n \mathscr{L} = P_n^{\mu_1\nu_1\rho_1\sigma_1\cdots\mu_n\nu_n\rho_n\sigma_n}\delta R_{\mu_1\nu_1\rho_1\sigma_1}\cdots\delta R_{\mu_n\nu_n\rho_n\sigma_n}$$

We have

$$\frac{\partial R_{\alpha\beta\gamma\delta}}{\partial R_{\mu\nu\rho\sigma}} = T_{\alpha\beta\gamma\delta}^{\mu\nu\rho\sigma} - T_{\alpha\beta\gamma\delta}^{\mu[\nu\rho\sigma]}, \qquad T_{\alpha\beta\gamma\delta}^{\mu\nu\rho\sigma} = \frac{1}{2}\left(\delta_\alpha^{[\mu}\delta_\beta^{\nu]}\delta_\gamma^{[\rho}\delta_\delta^{\sigma]} + \delta_\gamma^{[\mu}\delta_\delta^{\nu]}\delta_\alpha^{[\rho}\delta_\beta^{\sigma]}\right).$$

Algebraic properties

$$P^{\mu\nu\rho\sigma} = -P^{\nu\mu\rho\sigma} = -P^{\mu\nu\sigma\rho} = P^{\rho\sigma\mu\nu}, \qquad P^{\mu[\nu\rho\sigma]} = 0$$

The tensor P_n

Consider Riemann tensor $\hat{R}_{\mu\nu\rho\sigma} = 2\lambda g_{\mu[\rho}g_{\sigma]\nu}$, the form of $P^{\mu\nu\rho\sigma}$ is fixed

$$\hat{P}^{\mu\nu\rho\sigma} = P^{\mu\nu\rho\sigma}(g_{\mu\nu}, \hat{R}_{\mu\nu\rho\sigma}) = k_{1,1} g_{\mu[\rho}g_{\sigma]\nu}$$

What about $\hat{P}_n$? Since it's defined by

$$\delta^n \mathscr{L}\Big|_{\hat{R}_{\mu\nu\rho\sigma}} = \hat{P}_n^{\mu_1\nu_1\rho_1\sigma_1\cdots\mu_n\nu_n\rho_n\sigma_n} \delta R_{\mu_1\nu_1\rho_1\sigma_1}\cdots\delta R_{\mu_n\nu_n\rho_n\sigma_n}$$

So $\hat{P}_n$ can be chosen as

$$\hat{P}_n^{\mu_1\nu_1\rho_1\sigma_1\cdots\mu_n\nu_n\rho_n\sigma_n} = \sum_i k_{n,i} \frac{\partial^n \mathscr{R}_i^{(n)}}{\partial R_{\mu_1\nu_1\rho_1\sigma_1}\cdots\partial R_{\mu_n\nu_n\rho_n\sigma_n}}$$

where $\mathscr{R}^{(n)}$ is a list of n-th power Riemann scalar

The tensor P_n

$$\mathscr{R}^{(1)} = \{R\} \qquad \mathscr{R}^{(3)} = \{\text{(8 scalars)}\}$$

$$\mathscr{R}^{(2)} = \{R^2, R_{\mu\nu}R^{\mu\nu}, R_{\mu\nu\rho\sigma}R^{\mu\nu\rho\sigma}\}, \qquad \mathscr{R}^{(4)} = \{\text{(26 scalars)}\}$$

We have

$$\hat{P}^{\mu\nu\rho\sigma} = k_{1,1}\frac{\partial R}{\partial R_{\mu\nu\rho\sigma}} = k_{1,1}g^{\mu[\rho}g^{\sigma]\nu}$$

$$\hat{P}_2^{\mu\nu\rho\sigma\alpha\beta\gamma\delta} = k_{2,1}\frac{\partial^2 R^2}{\partial R_{\mu\nu\rho\sigma}\partial R_{\alpha\beta\gamma\delta}} + k_{2,2}\frac{\partial^2 (R_{\mu\nu}R^{\mu\nu})}{\partial R_{\mu\nu\rho\sigma}\partial R_{\alpha\beta\gamma\delta}} + k_{2,3}\frac{\partial^2 (R_{\mu\nu\rho\sigma}R^{\mu\nu\rho\sigma})}{\partial R_{\mu\nu\rho\sigma}\partial R_{\alpha\beta\gamma\delta}}$$
$$= C^{\mu\nu\rho\sigma\alpha\beta\gamma\delta} - C^{\mu[\nu\rho\sigma]\alpha\beta\gamma\delta} - C^{\mu\nu\rho\sigma\alpha[\beta\gamma\delta]} + C^{\mu[\nu\rho\sigma]\alpha[\beta\gamma\delta]}$$

$$C^{\mu\nu\rho\sigma\alpha\beta\gamma\delta} = 2k_{2,1}g^{\mu[\rho}g^{\sigma]\nu}g^{\alpha[\gamma}g^{\delta]\beta} + 2k_{2,2}\delta^{[\mu}_{(\epsilon}g^{\nu]}\delta^{[\rho}_{\kappa)}g^{\sigma]}g^{\epsilon[\alpha}g^{\beta][\gamma}g^{\delta]\kappa}$$
$$+k_{2,3}\left(g^{\mu[\alpha}g^{\beta]\nu}g^{\rho[\gamma}g^{\delta]\sigma} + g^{\mu[\gamma}g^{\delta]\nu}g^{\rho[\alpha}g^{\beta]\sigma}\right)$$

Important property: $\dfrac{\partial R_{\alpha\beta\gamma\delta}}{\partial R_{\mu\nu\rho\sigma}}H_{\mu\nu\rho\sigma} = H_{\alpha\beta\gamma\delta}$

FG expansion for GHC

In FG metric we have

$$R_{\mu\nu\rho\sigma} = -\frac{1}{L^2} g_{\mu[\rho} g_{\sigma]\nu} + \Delta R_{\mu\nu\rho\sigma}$$

So we can expand

$$\mathscr{L}(g_{\mu\nu}, R_{\mu\nu\rho\sigma}) = \mathscr{L}_0 + \hat{P}^{\mu\nu\rho\sigma} \Delta R_{\mu\nu\rho\sigma} + \frac{1}{2!} \hat{P}_2^{\mu\nu\rho\sigma\alpha\beta\gamma\delta} \Delta R_{\mu\nu\rho\sigma} \Delta R_{\alpha\beta\gamma\delta} + \mathcal{O}(\Delta R^3)$$

How to count the power?

Although $\Delta R_{\mu\nu\rho\sigma} = \mathcal{O}(1/\rho)$, we have $\Delta R_{\mu\nu}{}^{\rho\sigma} = \mathcal{O}(\rho)$, so we can expand $R_{\mu\nu}{}^{\rho\sigma}$

FG expansion for GHC

Choosing $(g_{\mu\nu}, R_{\mu\nu}{}^{\rho\sigma})$ as the independent variables, we have

$$\left[\frac{\partial \mathscr{L}}{\partial g_{\mu\nu}}\right]_{g_{\mu\nu}, R_{\mu\nu}{}^{\rho\sigma}} = 0$$

$$\mathscr{L}(g_{\mu\nu}, R_{\mu\nu\rho\sigma}) = \mathscr{L}_0 + \underbrace{\hat{P}^{\mu\nu}{}_{\rho\sigma}\Delta R_{\mu\nu}{}^{\rho\sigma}}_{\mathcal{O}(\rho)} + \underbrace{\frac{1}{2!}\hat{P}_2^{\mu\nu}{}_{\rho\sigma}{}^{\alpha\beta}{}_{\gamma\delta}\Delta R_{\mu\nu}{}^{\rho\sigma}\Delta R_{\alpha\beta}{}^{\gamma\delta}}_{\mathcal{O}(\rho^2)} + \mathcal{O}(\Delta R^3)$$

$\mathscr{L}_4$ needs expand to P_4 order.

Equation of motion

The solution of $g^{(1)}_{ab}$ is fixed by PBH transformation

$$g^{(1)}_{ab} = -\frac{L^2}{d-2}\left[R_{ab} - \frac{1}{2(d-1)}Rg^{(0)}_{ab}\right] = -L^2 P_{ab}$$

While $g^{(2)}_{ab}$ has two free parameters

$$g^{(2)}_{ab} = b_1\, C_{cdef}C^{cdef}g^{(0)}_{ab} + b_2\, C_{acde}C_b{}^{cde} - \frac{L^4}{4(d-4)}B_{ab} + \frac{1}{4}P_{ac}P^c{}_b$$

Two ways to obtain the equation of motion:

$$\mathscr{E}^\mu_\nu = (\hat{P}^{\mu\rho\sigma\delta} + \hat{P}_2^{\mu\rho\sigma\delta\alpha\beta\gamma\kappa}\Delta R_{\alpha\beta\gamma\kappa} + \cdots)(\hat{R}_{\nu\rho\sigma\delta} + \Delta R_{\nu\rho\sigma\delta}) - \frac{1}{2}\delta^\mu_\nu(\mathscr{L}_0 + \hat{P}^{\rho\sigma\alpha\beta}\Delta R_{\rho\sigma\alpha\beta} + \cdots) - 2(\hat{P}_2^{\mu\rho\sigma}{}_\nu{}^{\alpha\beta\gamma\kappa}\nabla_\rho\nabla_\sigma\Delta R_{\alpha\beta\gamma\kappa} + \cdots)$$

$$\frac{\delta}{\delta g_{ab}}(\sqrt{|g|}\mathscr{L})$$

Weyl anomaly in 8d

Wess-Zumino condition

$$[\delta_{\sigma_1}, \delta_{\sigma_2}]W[g_{ab}] = 0$$

Substituting

$$W[g_{ab}] = \int \mathrm{d}^d x \sqrt{|g|}\, \sigma \mathscr{A}, \qquad \mathscr{A} = \sum_{i=1}^{92} a_i \mathscr{R}_i^{(4)}$$

$$[\delta_{\sigma_1}, \delta_{\sigma_2}]W[g_{ab}] = \int \mathrm{d}^d x \sqrt{|g|}\, \sigma_2 \sum_{i=1}^{228} \sum_{j=1}^{92} \mathscr{H}_i(\sigma_1) M_{ij} a_j$$

$\dim \ker(M) = 43 \implies$ 43 linearly independent 8d Weyl anomalies

Weyl anomaly in 8d

Identify trivial anomalies

$$\delta_\sigma \int \mathrm{d}^d x \sqrt{|g|} \sum_{i=1}^{92} a_i \mathscr{R}_i^{(4)} = \int \mathrm{d}^d x \sqrt{|g|}\, \sigma \sum_{i,j=1}^{92} \mathscr{R}_i^{(4)} B_{ij} a_j$$

$r(B) = 32 \implies$ 32 trivial anomalies, $43 - 32 = 11$ non-trivial Weyl anomalies

One type A anomaly $E^{(8)} = 8!R_{a_1b_1}{}^{[a_1b_1}R_{a_2b_2}{}^{a_2b_2}R_{a_3b_3}{}^{a_3b_3}R_{a_4b_4}{}^{a_4b_4]}$

10 type B anomalies, with $I^{(8)}_{1,\cdots,7} \sim C^4$, $I^{(8)}_{8,9,10}$ contains derivatives

Weyl anomaly in 8d

Identify Weyl invariants in 8d

$$0 = \delta_\sigma \left[\sqrt{|g|}\sum_{i=1}^{92} a_i \mathscr{R}_i^{(4)}\right] = \sqrt{|g|}\sum_{i=1}^{92} a_i(\delta_\sigma \mathscr{R}_i^{(4)} + 8\sigma \mathscr{R}_i^{(4)}) = \sqrt{|g|}\sum_{i=1}^{151}\sum_{j=1}^{92} \mathscr{H}'_i(\sigma) K_{ij} a_j$$

$\dim \ker(K) = 12 \implies$ 12 Weyl invariants in 8d

There are two Weyl invariant trivial anomalies!

$$I_{11}^{(8)} = \nabla_a\Big(4\nabla_f P_{de} C^{abcd} C_b{}^e{}_c{}^f - 4\nabla_e P_{df} C^{abcd} C_b{}^e{}_c{}^f - \nabla_f P^a{}_e C^{bcde} C_{bcd}{}^f + \nabla^a P_{ef} C^{bcde} C_{bcd}{}^f + \nabla^f C^{bcde} C^{ag}{}_{bc} C_{dfeg}\Big),$$

$$I_{12}^{(8)} = \nabla_a\Big(-4\nabla_f P_{de} C^{abcd} C_b{}^e{}_c{}^f + 2\nabla_e P_{df} C^{abcd} C_b{}^e{}_c{}^f + 2\nabla_d P_{ef} C^{abcd} C_b{}^e{}_c{}^f + \nabla^f C^{bcde} C^a{}_{bd}{}^g C_{cgef} - \nabla^f C^{bcde} C^{ag}{}_{bc} C_{dfeg}\Big)$$

Results

a-charge: $a = \frac{L^7\pi^4}{36}k_{1,1} \propto S \propto -\bar{P}^{\mu\nu\rho\sigma}\epsilon_{\mu\nu}\epsilon_{\rho\sigma} = 2k_{1,1}$

First 7 c-charges $c_{1,\cdots,7}$

$c_i \sim \cdots + (b_1, b_2 \text{ terms}) + 256\pi^4 L k_{4,i+19}, \qquad i = 1,2$

$c_i \sim \cdots + 256\pi^4 L k_{4,i+19} \qquad i = 3,\cdots,7$

Last three c-charges $c_{8,9,10}$

$(c_8, c_9, c_{10}) \sim (C_T t_2, C_T t_4, C_T)$

After recombining $I^{(8)}_{8,9,10}$

$c_8 = c_{10}t_2, \qquad c_9 = c_{10}t_4, \qquad c_{10} = \frac{\pi^8}{622080}C_T$

$c_{10} = a$ for Einstein gravity

$I^{(8)}_{8,9} \sim \nabla^2 R^3, \qquad I^{(8)}_{10} \sim \nabla^4 R^2$

Result: the conjecture

Let $W_{(n)}$ be Weyl invariant with minimum n-th power in curvature

$d = 4$ $\quad I^{(4)} \in W_{(2)}, c \propto C_T$

2-pt

$d = 6$ $\quad \tilde{I}_3^{(6)} \in W_{(2)}, \tilde{c}_3 \propto C_T$ $\quad \tilde{I}_{1,2}^{(6)} \in W_{(3)}, \tilde{c}_1 \propto C_T t_2, \tilde{c}_2 \propto C_T t_4$

2-pt $\quad$ 3-pt

$d = 8$ $\quad I_{10}^{(8)} \in W_{(2)}, c_{10} \propto C_T$ $\quad I_{8,9}^{(8)} \in W_3, c_8 \propto C_T t_2, c_9 \propto C_T t_4$ $\quad I_{1,\cdots,7}^{(8)} \in W_{(4)}, c_{1,\cdots,7}$

2-pt $\quad$ 3-pt $\quad$ 4-pt?

Result: Einstein gravity case

$$L^{-7}\left\langle T^a_a\right\rangle = -\frac{1}{48}\mathrm{tr}(P)^4 + \frac{1}{24}\mathrm{tr}(\Omega^{(1)2}) + \frac{1}{6}\mathrm{tr}(P)\mathrm{tr}(P\Omega^{(1)}) + \frac{1}{24}\mathrm{tr}(P\Omega^{(2)}) + \frac{1}{8}\mathrm{tr}(P)^2\mathrm{tr}(P^2)$$
$$-\frac{1}{16}\mathrm{tr}(P^2)^2 - \frac{1}{6}\mathrm{tr}(P^2\Omega^{(1)}) - \frac{1}{6}\mathrm{tr}(P)\mathrm{tr}(P^3) + \frac{1}{8}\mathrm{tr}(P^4) + \text{(total derivatives)}$$

Where obstruction tensors

$$\Omega^{(1)}_{ab} = -\frac{1}{d-4}B_{ab}, \qquad \Omega^{(2)}_{ab} = \cdots$$

However, this does not happen in general higher curvature case.

Summary

- Calculated holographic Weyl anomaly in 8d from general higher curvature gravity,
- There are two Weyl invariant trivial anomalies in 8d,
- c-charges $c_8 \propto C_T t_2, c_9 \propto C_T t_4, c_{10} \propto C_T,$
- Conjecture: Weyl invariant $W_{(n)}$ is related to the energy-momentum tensor n-point function.

Thanks for you attention!