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(Confining) Holographic QFTs on AdS

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We consider three related topics: (a) Holographic quantum field theories on AdS spaces. (b) Holographic interfaces of flat space QFTs. (c) Wormholes connecting generically different QFTs. We investigate in a concrete example how the related classical solutions explore the space of QFTs and we construct the general solutions that interpolate between the same or different CFTs with arbitrary couplings. The solution space contains many exotic RG flow solutions that realize unusual asymptotics, as boundaries of different regions in the space of solutions. We find phenomena like "walking" flows and the generation of extra boundaries via "flow fragmentation". We then consider holographic quantum field theories that confine (in flat space), on a fixed AdS space. The space of holographic solutions for such theories is constructed and three types of regular solutions are found. Theories with two AdS boundaries provide interfaces between two confining theories. Theories with a single AdS boundary correspond to ground states of a single confining theory on AdS. We find solutions without a boundary, whose interpretation is not obvious. There is also a special limiting solution that oscillates an infinite number of times around the UV fixed point. We analyze in detail the holographic dictionary for the one-boundary solutions and compute the free energy. No (quantum) phase transitions are found when we change the curvature. We find an infinite number of pure vev solutions, but no CFT solution without a vev. We also compute the free energy of the interface solutions. We find that the product saddle points have always lower free energy than the connected solutions. This implies that in such interfaces, normalized cross-correlators vanish exponentially in N2c.

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