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Holographic Floquet states in low dimensions

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I'll discuss our recent work, in which we study holographically a strongly coupled (2+1)-dimensional gauge theory subject to an external rotating electric field, both at zero and non-zero temperature. The system is modelled holographically as a D3/D5 probe intersection, and we analyze the phase diagram. We find a conductive phase and an insulating phase, and we observe that the conductive phase extends down to vanishing external electric field at discrete values of the frequencies where vector meson Floquet condensates form. For all temperatures, at given intercalated frequencies, we find new dual states that we name Floquet suppression points, where the vacuum polarization vanishes even in the presence of an electric field. From the data we infer that these states exist both in the conductive and insulating phases. In the massless limit we find a linear and instantaneous conductivity law, recovering known general results in 2+1 dimensions. We also examine the photovoltaic AC and DC current as the response to an oscillating probe electric field and see that rising the temperature suppresses the photovoltaic Hall current. All the results obtained carry over qualitatively unaltered to the case of D3/D7.

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