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Analogies between the black hole interior and the type II Weyl semimetals

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It was proposed recently that the black hole may undergo a transition to the state, where inside the horizon the Fermi surface is formed that reveals an analogy with the recently discovered type II Weyl semimetals. In this scenario the low energy effective theory outside of the horizon is the Standard Model, which describes excitations that reside near a certain point P(0) in momentum space of the hypothetical unified theory. Inside the horizon the low energy physics is due to the excitations that reside at the points in momentum space close to the Fermi surface. We argue that those points may be essentially distant from P(0) and, therefore, inside the black hole the quantum states are involved in the low energy dynamics that are not described by the Standard Model. We analyse the consequences of this observation for the physics of the black holes and present the model based on the direct analogy with the type II Weyl semimetals, which illustrates this pattern.

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