Black holes and the double copy

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Abstract

We investigate the double copy problem in the vicinity of a black hole for the first time. We prove explicitly that, if the Schwarzschild black hole is coupled to a graviton field, it is a black hole with a degenerate contribution to the force acting on the graviton. In this case, the Schwarzschild black hole is treated similarly to the double copy of a asymptotically flat black hole with a fermion field. We also show that, if the Schwarzschild black hole is coupled to a graviton field, its Schwarzschild black hole is a black hole with a degenerate contribution to the field force.