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Fifty years of Hawking radiation

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In 1974, Hawking published a letter in Nature that initiated new and important lines of researches in gravitational physics. Using quantum field theory in a spacetime with collapsing matter, he obtained that black holes radiate as black bodies at a given temperature which depends on the black hole parameters, now known as the Hawking temperature. The detailed version of the Hawking radiation was published in 1975 in the journal Communications in Mathematical Physics. Bekenstein's earlier hypothesis that black holes are thermodynamic objects was thus put on firm ground. This outstanding work of Hawking, whose 50th anniversary we celebrate in the XVII Black Holes Workshop, constitutes one of the landmarks in the foundation of current frontiers of research, namely, quantum field theory in curved spacetimes, semiclassical gravity, and black hole thermodynamics. In this talk, I will give a review of Hawking radiation and a survey of the research that sprouted from this seminal work in its fifty years. I will venture into the challenges that are reserved for us in this area in the next fifty years.

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