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(G) Black hole collapse in loop quantum gravity: beyond the marginally trapped case

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Although black holes have recently been detected through gravitational wave observations and intensively studied through the past decades, we are far away from a complete understanding of their life cycle. In this presentation I'll show a loop quantum gravity-based model of star collapse in which the classical central singularity is replaced by a quantum bounce happening when the star energy density becomes planckian. Immediately after the bounce a shockwave of matter arises carrying all the initial star mass, that then slowly moves outward. The shockwave requires a time proportional to the square of the original star mass to reach the black hole horizon and when this happens, the horizon disappears. This signals the end of the black hole, while the outgoing shockwave becomes visible to external observers. This picture is robust as it holds for a wide range of initial data, in particular including non-marginally trapped configurations.

Keyword-1

shockwaves from black holes

Keyword-2

Loop Quantum Gravity

Keyword-3

star collapse

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