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Testing the area theorem with gravitational wave signals

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Observations of gravitational waves from binary black hole coalescences provide an opportunity for testing the black hole area increase law, also known as the area theorem. For loud enough signals, the inspiral (ringdown) part of the waveform provides a measurement of the initial (final) parameters of the black holes. We explore how to perform such measurements with Advanced LIGO in order to independently obtain the initial and final areas. These measurements will allow us to calculate the probability that the final area has indeed increased to determine if a specific gravitational-wave event is compatible with the area theorem.

Auteur principal: Mlle CABERO MUELLER, Miriam (Albert Einstein Institute Hannover)

Orateur: Mlle CABERO MUELLER, Miriam (Albert Einstein Institute Hannover)

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