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Holographic Complexity and Black Hole Thermodynamic Volume

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I describe the first investigation of the holographic complexity conjectures for rotating black holes. Exploiting a simplification that occurs for equal-spinning odd dimensional black holes, I demonstrate a relationship between the complexity of formation and the thermodynamic volume associated with the black hole. This result suggests that it is thermodynamic volume and not entropy that governs the complexity of formation in both the Complexity Equals Volume and Complexity Equals Action proposals. This proposal reduces to known results involving the entropy in settings where the thermodynamic volume and entropy are not independent, but has much broader scope. Assuming the validity of a conjectured inequality for thermodynamic volume, this result suggests the complexity of formation is bounded from below by the entropy for large black holes.

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