

Abstract Submitted  
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**Entropy of the Black Hole Universe**<sup>1</sup> AMELIA ALLEN, Agnes Scott College, TIANXI ZHANG<sup>2</sup>, Alabama A&M University — This project aimed to determine the entropy of the black hole universe and the entropy of the cosmic microwave background and to compare these calculations to observations of the universe. The black hole universe model was proposed by Dr. Zhang in an earlier paper. Black hole universe entropy was calculated and graphed as a function of mass and compared to the entropy of an object forming a black hole of that mass. The graph showed a direct relationship between mass and black hole universe entropy and that black hole entropy is greater than the entropy of objects forming the black hole. Black hole universe entropy was graphed as a function of density, which showed an inverse relationship between entropy and universe density. Both of these graphs are consistent with observations of the universe and with the Second Law of Thermodynamics. Cosmic microwave background (CMB) entropy was calculated and graphed as a function of temperature, showing an inverse relationship as expected. CMB entropy graphed as a function of radius showed a direct relationship, which agrees with observations of the universe. These results show that the black hole universe theory is consistent with existing laws of physics and observations of the universe.

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