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COLOR OF THE FUTURE COSMOS: DETERMINING THE SPECTRA AND INTENSITIES OF THE UNIVERSE'S ENERGY BACKGROUND OVER TIME[1] TRINITY TAYLOR, KATIE MACK, North Carolina State University — The Universe's radiation has evolved since the Big Bang and could change how our future looks. The radiation we now use to observe the sky may not be accessible later; galaxies and the Cosmic Microwave Background (CMB) may not be detectable in 100 billion years. I am determining what types of energy will dominate the Universe in the future by programming four mathematical models of the change in radiation from stars, the CMB, dark matter (DM), and Hawking radiation (HR) over time. Because I am examining theoretical sources of radiation, I'm using standard assumptions. For DM, I assume particles can annihilate one another to produce energy. Annihilation rates would increase as DM clusters together due to gravity, but universal expansion will slow the process. HR causes black holes to lose mass, but noticeable differences would be seen after a long time when black hole accretion stops. As stars burn out, HR and DM annihilation rates will continue increasing. The CMB, residual radiation from the Big Bang, loses energy as the Universe continues to expand until it becomes barely detectable. Based on these four trends, I hypothesize that HR will be the most dominant in the far future, DM annihilation second, starlight third, and CMB radiation being the least dominant.

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