Quantum Cosmology: An Exploration of the Origins of the Universe and Quantum Physics

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We all know of the Big Bang Theory and how the universe exploded into existence, but there are a few inconsistencies with this theory. These inconsistencies are called the Flatness Problem, which points to the fact that the observed flatness of the universe does not line up with the fact that the universe is expanding. Alan Guth attempted to solve this problem with his Theory of Inflation and this two-phase experiment proves his theory. Using a cloud chamber, we can track cosmic microwave background radiation coming from all directions in the universe and then model inflation with a balloon. Radiation is tracked in a cloud chamber by the streaks it leaves behind. The balloon is inflated and measurements of curvature and width are taken at regular intervals. The radiation was found to be coming from all directions and going in all directions in equal proportions. The balloon showed a trend of becoming flatter as the width increased. This experiment finds that background radiation in the cloud chamber is connected to inflation because of constant density, as modeled by the balloon. Because the density in the balloon stays constant as the balloon inflates, the balloon appears to get flatter just like the universe does and explains why the radiation seen in the chamber is spread evenly throughout the universe. This is an exciting way to peer into the origins and nature of our universe.

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