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what you're doing...

Matter/Antimatter Asymmetry

Derek Bierly (Hereford High School), Danny Mahoney (Hereford High School), and Trenton Worpell (Hereford High School) Jeremy Smith (Hereford High School) and John Pisanic (Damascus High School) Dr. Bruce Barnett (Johns Hopkins University)

The purpose of our research was to investigate the theories that try to explain the unequal amounts of matter and antimatter observed in the universe. To thoroughly understand the aspects of this “problem” we did extensive research on many of the important studies performed in the field. From CP Violation and kaon decay to the Alpha Magnetic Spectrometer, we learned why and how (I think ‘why’ and ‘how’ are still mysteries; for now, all we know is that it is so!) we ended up with a matter-dominated universe, and what could have happened to the missing antimatter. The knowledge available in the scientific community today comes from decades of experimentation and theoretical work from great physicists such as Dirac, Anderson, Fitch, Cronin, Cabbibo, Kobayashi, and Maskawa; as well as data from experiments including BaBar, Belle, CDF, and the LHC (Fix agreement of names of beams/detectors: BaBar was detector at SLAC in Stanford; CDF was detector for Tevatron at FNAL; LHCb is the b-meson detector of the LHC at CERN). The asymmetry in B-meson decay, observed in the BaBar and Belle experiments, was a key discovery in explaining the lack of observed antimatter in the universe. Further research should be done on the new findings of the

pear-shaped nuclei, found in radium and radon isotopes, which could give more insight into the matter/antimatter mystery.