

Introduction



BANG! In the first instant of creation, the universe was an incredibly hot and fantastically dense fireball. The universe was born with perfectly symmetrical crystalline laws, and a single force that determined the behaviour of its constituents. Within a moment, the temperature began to fall as the universe expanded and the perfect symmetry was lost. The original force was shattered into several disparate pieces. One force would hold the quarks together in the atomic nucleus. One force would transmute matter and make the different elements. And one force would bind the atoms and control their chemical reactions.

The modern synthesis of particle physics can explain how all this happened 13.7 billion years ago and how the same laws control the behaviour of matter today. Unfortunately, these esoteric secrets are known to but a few initiates, the High Priests of Particle Physics. They are hidden behind a veil of abstract and subtle mathematics. But, I will be drawing back the veil and revealing the secrets of the universe to anyone who cares to take a look.

Physicists have discerned a beautiful and symmetrical architecture beneath the apparent chaos of the world in which we live. The universe is constructed from an elegant geometrical design based on a few simple principles. However, if the universe displayed this perfect symmetry in its entirety, it would be completely unchanging, formless and barren. This is not at all what our universe looks like. We live in a universe that is dynamic and full of activity. Here we have a profound enigma: if the structure of matter is organised in an orderly and symmetrical fashion at its deepest level, where does the diversity and complexity of the world come from? Physicists now think that they have the answer.