



RESEARCH

LUNA MEASURES THE DENSITY OF ORDINARY MATTER

There is a key reaction of that fundamental process, called Big Bang nucleosynthesis, which led to the production of lighter chemical elements in the first moments of life of our universe. It is the reaction leading to one of the two stable Helium isotopes, Helium-3, from one proton and one deuterium nucleus. The LUNA experiment has now investigated this reaction with unprecedented precision at the INFN Gran Sasso National Laboratories. It was, thus, possible to refine the calculations of Big Bang nucleosynthesis, obtaining an accurate determination of the density of ordinary matter (baryonic matter), of which everything that we know is made. The density of baryonic matter obtained through the LUNA result coincides very well with the value obtained from the study of cosmic background radiation, the residual “fossil” of the Big Bang. The results of the LUNA measurements, together with a discussion of their cosmological consequences, were published on 11 November in the journal Nature. The LUNA experiment will continue its scientific activity over the next decade with the LUNA-MV project, which is focused on studying key processes for the chemical composition of the universe and the nucleosynthesis of the heaviest elements. ■