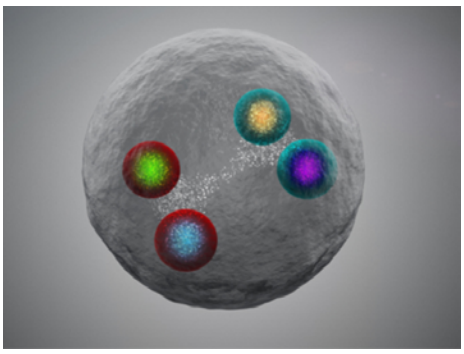

RESEARCH

## THE LHCB EXPERIMENT OBSERVES A NEW TYPE OF TETRAQUARK

The international collaboration of the LHCb experiment that operates at CERN's LHC accelerator published, on 1 July, on arXiv *a study* on the first observation of a particle composed of four charm quarks. The results constitute an important step forward in understanding how quarks bind via strong nuclear interactions inside the composite particles, known as hadrons. Protons and neutrons, the constituents of atomic nuclei, also belong to the hadron family. Ordinarily, the quarks bind in pairs (mesons) or triplets (baryons), but the existence of more complex particles consisting of four quarks (tetraquarks), five quarks (pentaquarks), or more is not, generally, prohibited by the theory. Decades of research were necessary, however, to be able to identify just a few examples of them. The LHCb experiment had already confirmed the existence of these exotic particles and observed a pentaquark for the first time in 2015. This discovery, in any case, relates to a particle with peculiar characteristics, composed of four heavy quarks, representing a favourable testing ground for the development of theoretical models of strong interactions. The LHCb collaboration obtained confirmation of the existence of the new particle by analysing the great mass of data produced by the collisions between ultra-energetic protons accelerated by the LHC and acquired by the detector over the course of several years. The role of the INFN Division of Florence group involved in LHCb was central to this work. This group had, right from the start, the responsibility for analysing the data in all its detail. INFN is one of the biggest contributors to the project and to the construction and operation of the detector, counting more than a hundred researchers, technologists, and technicians in the collaboration. ■