

LHCb Physics

Mystery of Anti-matter

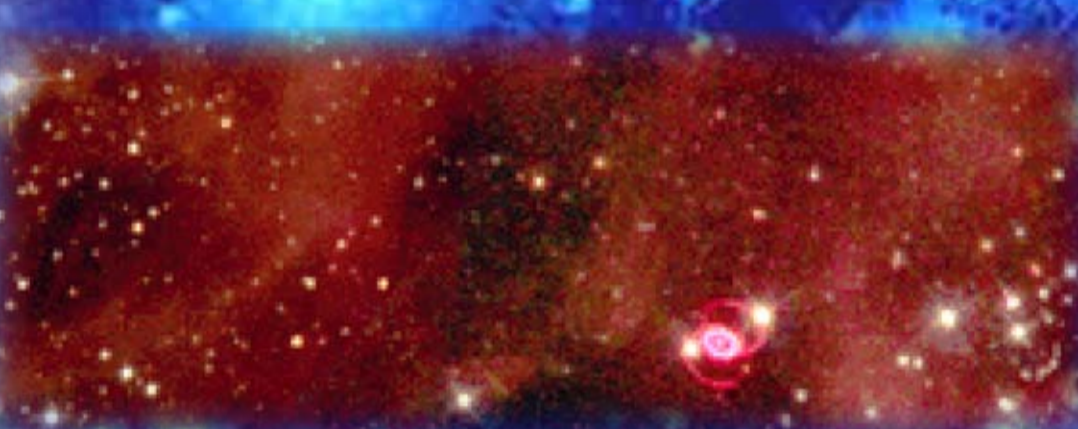
> Mystery of Anti-matter

It is generally believed that, when the Big Bang occurred about 15×10^9 years ago, matter and anti-matter were produced in equal amounts. Our present universe exists almost completely of matter...

> Investigate the Anti-matter

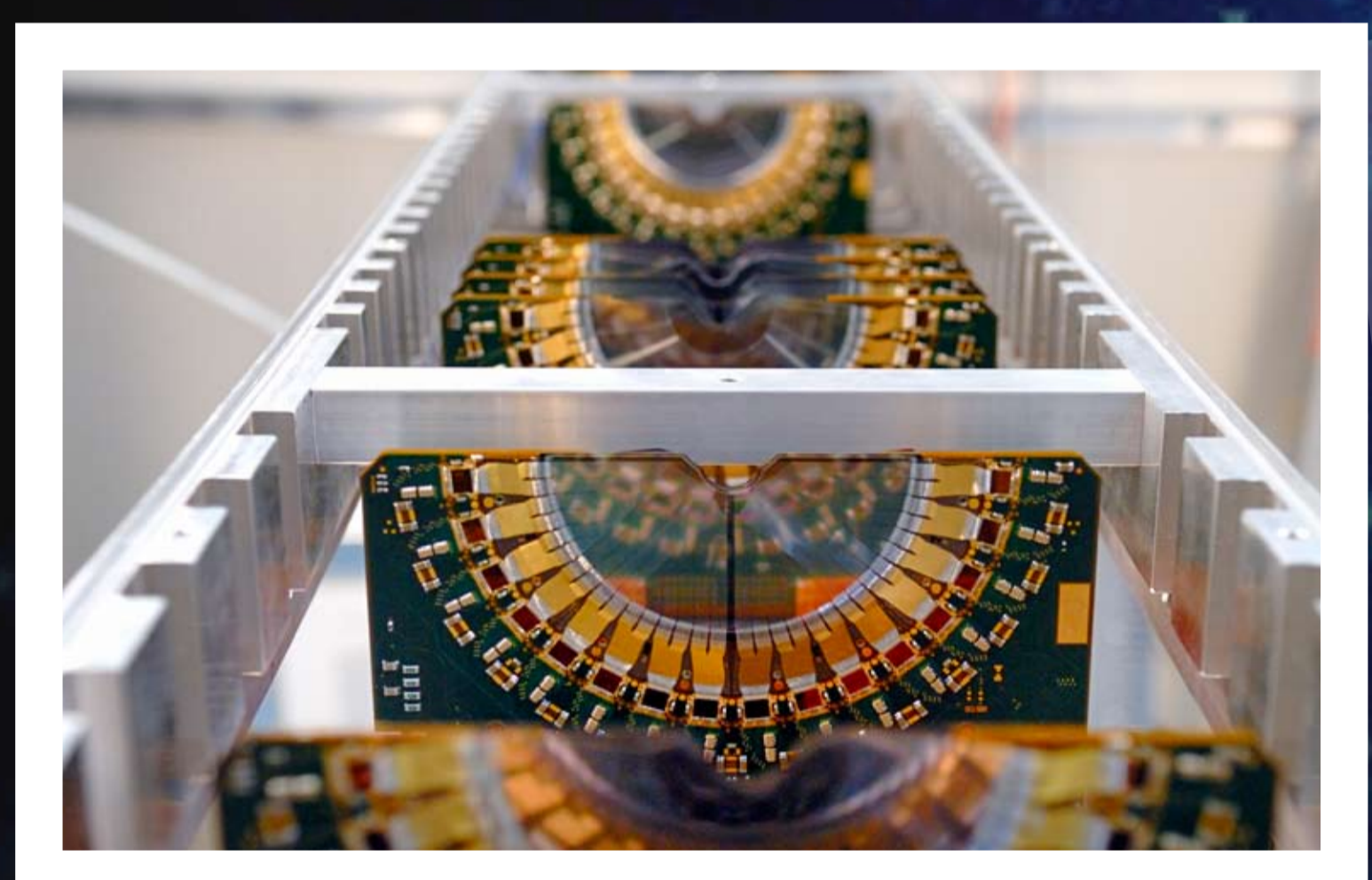
Study of the decay of B-mesons (particles that contain a b-quark) is used to investigate the matter-antimatter asymmetry in nature.

< Matter-Anti-matter asymmetry in the universe



LHCb detector at LHC, CERN, Geneva >

Silicon strip detector >



> Nobel Prize 2008

For the discovery of the origin of this broken symmetry, which predicts the existence of at least three families of quarks in nature



< Toshihide Maskawa



Makoto Kobayashi >



$$\begin{bmatrix} u \\ c \\ t \end{bmatrix} \begin{bmatrix} V_{ud} & V_{us} & V_{ub} \\ V_{cd} & V_{cs} & V_{cb} \\ V_{td} & V_{ts} & V_{tb} \end{bmatrix} \begin{bmatrix} d \\ s \\ b \end{bmatrix}$$

> Supersymmetry

Subtle quantum effects might reveal the existence of supersymmetric particles. Counting B-decays, measuring angular asymmetries, and studying interference effects can all show the presence of new particles

