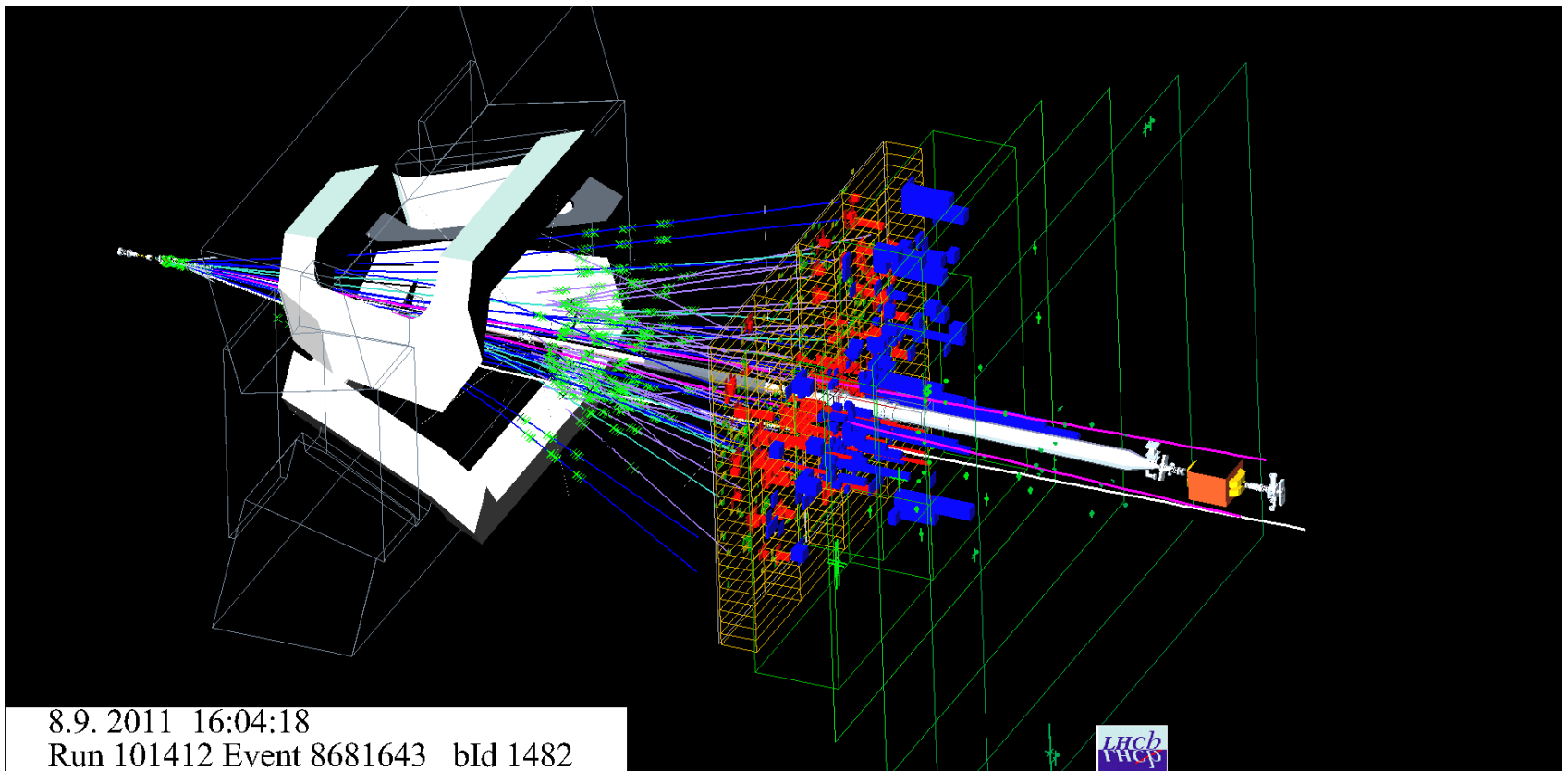


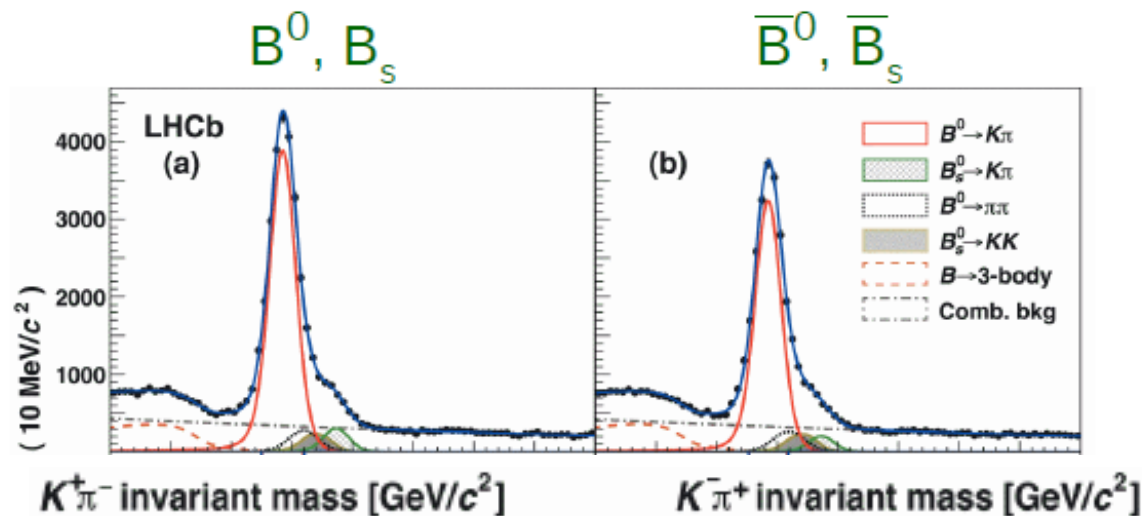
# CP violation measurement in two body B decays with the LHCb detector



Differences between the behavior of matter and antimatter (or ‘CP violation’) can be observed in B meson decays.

The goal of this exercise is to measure the CP asymmetry in the decay of a  $B^0$  meson into a charged pion and kaon :

$$A_{CP} = \frac{\Gamma(B^0 \rightarrow K^+ \pi^-) - \Gamma(\bar{B}^0 \rightarrow K^- \pi^+)}{\Gamma(B^0 \rightarrow K^+ \pi^-) + \Gamma(\bar{B}^0 \rightarrow K^- \pi^+)}$$



Difficulty: separate the different signal components!

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Exercise:

First step using **simulated data**:

- Define a selection based on particle identification to find your signal

Second step on **real LHCb data**:

- Apply the selection and perform fits of the invariant mass

Compute the CP asymmetry and compare with the published result