DIRAC 2009 annual report

1. The first results on searching for πK atoms were published. In total 173±54 πK-atomic pairs were observed with a significance of 3.2σ.
B. Adeva et al.,"*Evidence for πK-atoms with DIRAC*", Physics Letters B 674 (2009) 11.

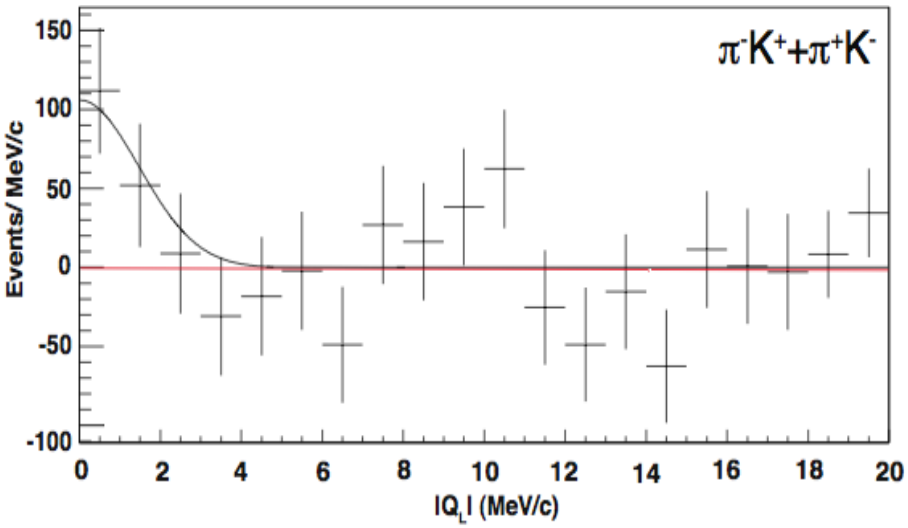

Fig. Distribution over the longitudinal component of CMS relative momentum of the pairs from breakup of πK-atoms. The peak at the origin corresponds to 173±54 πK-atomic pairs.

2. DIRAC took data during 6 months for observation of the atoms consisting of π and K mesons and improvement of the accuracy in the lifetime measurement of $\pi\pi$ atoms. The data collected exceed the amount of 2008 data by 60%.

3. The data collected in 2008 were processed in simplified approach (without inclusion of the Micro-Drift Chambers). The estimated amount of the produced $\pi\pi$ atoms in these data is 8000 and πK atoms - around 100. Basing on this analysis an additional beam time was asked for 2010.

4. The data collected in 2001-2003 were processed and analyzed basing on the information from all detectors including Micro-Strip Gas Chambers, the accuracy in the $\pi\pi$ atom lifetime exceed 10%, the total amount of observed $\pi\pi$ atoms is about 18000. (Only 13300 atoms were reconstructed in previous analysis.)

Plans for 2010.

1. As observed production rate of the πK pairs was proved to be 6 times less with respect to the simulated data used for the time scale estimation and the total amount of primary proton-target interactions provided by PS in 2008-2009 is by 60% less with respect to the planed amount the collaboration can not guarantee observation of the πK atoms basing on the 2008-2009 data. For this reason the collaboration have asked SPSC for the additional 6 month run in 2010 for observation of πK atoms and improvement of the accuracy in the $\pi\pi$ atom lifetime up to 6%. This request has been approved by SPSC CERN and DIRAC will take data during 6 months in 2010 to complete the declared program.
2. Processing of the data collected in 2001-2003 will be completed and results on the $\pi\pi$ atom lifetime will be published.
3. A new addendum to the proposal DIRAC on observation of the long-lived (metastable) states of $\pi\pi$ atoms will be prepared and submitted to SPSC by August 2010.