

Status report of DIRAC (PS 212) experiment.

SPS Committee, April 2010.

1. The 2001-2003 data, processing and analysis using MSGC/GEM.

All experimental data are processed using information from all detectors including the micro strip chambers with the GEM. The full statistics is 20020 atomic pairs. The distributions of the longitudinal (Q_l) and transverse (Q_t) components of the relative momentum (Q) in the pi-pi center of mass system are presented for the complete statistics. Preliminary values of all systematic errors are available.

2. Status of the 2008 data on pi-pi atoms.

All data are processed, yet without using information from micro drift chambers (MDC). At present time, a first version of MDC software is implemented in the data processing. First results are presented about the increase of the number of identified atoms when MDC information is used. The Monte-Carlo distributions of Q , Q_l and Q_t of the Coulomb, non-Coulomb and atomic pairs are ready.

3. Status of 2008 data on K^+ pi- and K^- pi+ atoms.

The status of the experimental data is the same as that of pi-pi atoms. The Monte-Carlo distributions of Q , Q_l and Q_t of the Coulomb and non-Coulomb pairs are ready. The work on the Monte-Carlo distributions of the K-pi atomic pairs is in progress.

4. Status of 2009 data.

All calibrations of drift chambers and other detectors are completed. The preselection of the data will begin in one month.

5. Plan of the 2010 run.

We will install new memories for this run to increase the reliability of the DAQ and to decrease the dead time of the readout system. The principal aim of this run is the data taking needed for the observation of K^+ pi- and K^- pi+ atoms and their lifetime measurement. The full statistics of pi-pi atoms will allow to measure their lifetime with a precision of 6% or better and the difference of their scattering lengths with a precision of 3% or better. A few days will be used to take data using a thin Be target (100 micrometers) to study the experimental conditions necessary to observe long-lived pi-pi atoms.

6. ADDENDUM.

Using the experimental results obtained with Be target in the autumn of 2010, a new Addendum will be presented. Its aim is the observation of long-lived pi-pi atoms. This opens the possibility to measure the energy difference between n_s and n_p levels of pi-pi atom and to extract an additional combination of pi-pi scattering lengths.

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