Contribution ID: 2 Type: not specified

First πK atom lifetime and πK scattering length measurements

Wednesday, 17 September 2014 13:50 (20 minutes)

Theory, using Low Energy QCD, calculated with high precision the $\pi\pi$ and πK scattering length. Because these calculations are

using the chiral symmetry that describe quarks, gluons, and the QCD

vacuum property, the experimental check of these predictions is important. To check the theoretical calculations for the process

including also s quarks we must measure the πK atom lifetime that is connected to the πK scattering lengths by a precise relation. The results of the search for hydrogen-like atoms consisting of π^-K^+ and π^+K^- mesons are presented. Evidence for πK atoms production, using a 24 GeV/c protons beam from CERN PS interacting with a nickel target, is reported here. From the analysis of Coulomb final state interaction πK pairs was evaluated the number of produced πK atoms $N_A=653\pm42$ together with the value of the πK pairs from atoms that breakup in the same target $N_a=178\pm49$. Using these results the analysis yields to a first value for the πK atom lifetime of $t=2.5^{+3.0}_{-1.8}$ fs and a first model-independent measurement of the S-wave isospin-odd πK scattering length $|a0-|=1/3|a_{1/2}-a_{3/2}|=0.11^{+0.09}_{-0.04}~1/M_{\pi}$ (the I in a_I stands for isospin).

Primary author: Dr YAZKOV, Valeriy (Skobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University)

Presenter: Dr YAZKOV, Valeriy (Skobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University)

Session Classification: session II