



Contribution ID: 146

Type: **not specified**

## Neutral pion form factor measurement and Search for $K^+$ to $\pi^+$ $\nu\nu$ at NA62

*Wednesday 13 July 2016 11:20 (20 minutes)*

The NA62 experiment at CERN SPS collected a large sample of charged kaon decays with a highly efficient trigger for decays into electrons in 2007 using the experimental setup of the earlier kaon experiment at CERN NA48/2. The kaon beam represents a source of tagged neutral pion decays in vacuum. A measurement of the electromagnetic transition form factor slope of the neutral pion in the time-like region from  $\sim 1$  million fully reconstructed  $\pi^0$  Dalitz decay is presented. The limits on dark photon production in  $\pi^0$  decays from NA48/2 are also reported. The  $K^+ \rightarrow \pi^+ \nu\nu$  decay is one of the theoretically cleanest meson decay where to look for indirect effects of new physics complementary to LHC searches. The new experimental setup used by the NA62 experiment at CERN SPS since 2014 is designed to measure the branching ratio of this decay with 10% precision. NA62 took data with the new setup in pilot runs in 2014 and 2015 reaching the final designed beam intensity. The quality of data acquired in view of the final measurement will be presented.

### Summary

The NA62 experiment at CERN SPS collected a large sample of charged kaon decays with a highly efficient trigger for decays into electrons in 2007 using the experimental setup of the earlier kaon experiment at CERN NA48/2. The kaon beam represents a source of tagged neutral pion decays in vacuum. A measurement of the electromagnetic transition form factor slope of the neutral pion in the time-like region from  $\sim 1$  million fully reconstructed  $\pi^0$  Dalitz decay is presented. The limits on dark photon production in  $\pi^0$  decays from NA48/2 are also reported. The  $K^+ \rightarrow \pi^+ \nu\nu$  decay is one of the theoretically cleanest meson decay where to look for indirect effects of new physics complementary to LHC searches. The new experimental setup used by the NA62 experiment at CERN SPS since 2014 is designed to measure the branching ratio of this decay with 10% precision. NA62 took data with the new setup in pilot runs in 2014 and 2015 reaching the final designed beam intensity. The quality of data acquired in view of the final measurement will be presented.

**Primary author:** LAZZERONI, Cristina (University of Birmingham (GB))

**Co-author:** ZAMKOVSKY, Michal (Charles University (CZ))

**Presenter:** ZAMKOVSKY, Michal (Charles University (CZ))

**Session Classification:** Parallel IV

**Track Classification:** Dark Matter, Dark Energy, Astroparticle