

## HK 43: Plenary V

Time: Wednesday 9:00–10:30

Location: Audi-Max

**Invited Talk** HK 43.1 We 9:00 Audi-Max  
**Determination of  $V_{ud}$  from mirror transitions and the role of atom and ion traps** — ●OSCAR NAVILIAT-CUNCIC — LPC-Caen, ENSICAEN, Université de Caen, IN2P3/CNRS, Caen, France

The  $V_{ud}$  element of the Cabibbo-Kobayashi-Maskawa quark mixing matrix has traditionally been determined from the analysis of data in three semileptonic processes, namely, nuclear superallowed  $0^+ \rightarrow 0^+$  transitions, neutron decay and pion beta decay.

It has recently been shown that the value of  $|V_{ud}|$  can independently be determined from the analysis of T=1/2 nuclear mirror transitions and that this value is more precise than the pion result, competitive with the neutron result and consistent with that from  $0^+ \rightarrow 0^+$  transitions. The extraction of  $|V_{ud}|$  from mirror transitions requires (like the neutron decay) the knowledge of the associated Gamow-Teller/Fermi mixing ratios which can directly be obtained from beta decay correlation measurements. Such measurements have recently been performed with high precision using atom traps.

We review here recent achievements obtained in beta decay correlation measurements using atom and ion traps and discuss their potential for the determination of GT/F mixing ratios in mirror transitions with the aim to further improve the extraction of  $|V_{ud}|$ .

**Invited Talk** HK 43.2 We 9:30 Audi-Max  
**Light Meson Experiments** — ●TORD JOHANSSON — Uppsala University

There are many challenging and open questions in the light meson

sector with respect to the production dynamics and the meson interactions and decays. Improvements of accelerator facilities and experimental set-ups, together with a better theoretical understanding, have led to a lively activity in this field. Recent experimental results involving light mesons obtained by using both electromagnetic and hadronic probes for their production will be reviewed, together with an outlook for the field.

**Invited Talk** HK 43.3 We 10:00 Audi-Max  
**Nuclear Astrophysics at the Gran Sasso underground laboratory** — ●HEIDE COSTANTINI — INFN-Genova Italy

The origin and build up of elements is one of the key questions for our understanding of the universe. Thermonuclear nucleosynthesis processes occurring in stellar and explosive scenarios are responsible for the production of the elements. The talk will focus on the experimental study of quiescent stellar H and He burning nuclear reactions which cross section measurements are hampered mainly by extremely low counting rate and cosmic background. Some of the main reactions of H-burning phase have been measured at the LUNA facility (Laboratory for Underground Nuclear Astrophysics) taking advantage of the very low background environment of the Underground Gran Sasso National Laboratory in Italy. An overview of the adopted experimental techniques will be given together with the main results obtained for the  $^{14}\text{N}(p,g)^{15}\text{O}$  and  $^3\text{He}(4\text{He},g)^7\text{Be}$  reactions and the status of the ongoing experiments. Furthermore a brief summary of possible future studies that could be performed in a new underground facility, will be presented.