



Contribution ID: 58

Type: Oral

## Novel approaches to the nuclear physics of double beta decay

*Saturday, 21 October 2017 10:00 (30 minutes)*

This talk will be concerned with the nuclear physics, which drives the double-beta decay and here in particular the double-beta decay with no neutrinos. First, some of the issues of the nuclear matrix elements (NMEs) in double-beta decay will be dealt with using charge-exchange reactions. However, the focus will quickly change to charge-exchange reactions to identify higher-order multipoles as they appear in the NMEs for the neutrinoless decay. Some surprises have been unveiled about low-lying spin-dipole excitations, and some of the short-comings of nuclear models describing the low-lying strength will be discussed.

I will then turn to precision mass measurement in the context of double-beta decay, where the nucleus  $^{96}\text{Zr}$  will be at its center. By knowing the exact masses of the  $A=96$  mass triplet, the  $^{96}\text{Zr}$  4-fold uniquely forbidden single-beta decay can provide strong constraints on nuclear models describing neutrinoless double-beta decay, including constraints on the value of the axial-vector coupling constant  $g_A$ .

Finally, I will describe a novel experimental approach to measure partial muon-capture rates in an attempt to get an experimental handle on the quenching of  $g_A$  in single- and double-beta decay. Central to this are the capture rates to some of the low-lying  $J^\pi=1^+$  states in the pf- and sd-shell nuclei  $^{24}\text{Mg}$ ,  $^{32}\text{S}$ , and  $^{56}\text{Fe}$ , which are very well-known from  $(d, 2\text{He})$  reactions. The experiment will make use of the upcoming MuSIC / CAGRA facility at the Research Center for Nuclear Physics in Osaka, Japan.

**Primary author:** Prof. FREKERS, Dieter (Univ. Muenster)

**Presenter:** Prof. FREKERS, Dieter (Univ. Muenster)

**Session Classification:** Plenary