Poster session 1 - Monday 4 July

P1.061 **Pulse shape discrimination techniques for the COBRA experiment**

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Neutrino physics has opened the door to new physics beyond the well-established Standard Model of particle physics. Several questions arise from the fact that oscillation experiments have proven that neutrinos feature a non-vanishing rest mass. Among them is the so far unknown nature of neutrinos: either neutrinos are so-called Majorana particles, where one cannot distinguish between particle and antiparticle, or they act as Dirac particles like known from all the other fermions in the Standard Model. The study of neutrinoless double beta-decay ($0\nu\beta\beta$-decay) could answer the question regarding the underlying nature of neutrinos and might also shed light on the open question of the neutrino mass ordering. So far there is no experimental evidence for such a lepton avor violating process, hence, existing experiments have to be improved and novel techniques should be explored.

One of the next-generation experiments dedicated to the search for $0\nu\beta\beta$-decay is COBRA, an acronym for Cadmium Zinc Telluride 0-Neutrino Double Beta Research Apparatus. Currently a demonstrator setup at the underground facility LNGS in Italy collects high quality low background physics data with 4×4×4 monolithic, calorimetric detectors with a coplanar grid (CPG) design. The detectors are 1×1×1 cm3 in size and are made of CdZnTe, which is a commercially available room temperature semiconductor. It contains naturally several double beta decay candidates. The most promising is ^{116}Cd with a Q-value of 2.8 MeV, which is well above the highest prominent γ-lines occurring from natural radioactivity.

The poster presents an overview of the experimental status and focuses on pulse shape discrimination techniques to reject background.

The COBRA experiment is funded by the German Research Foundation DFG.