physical r-process.

The three competing decay channels spontaneous fission, α-decay and β-decay are compared.

Lifetimes and reaction rates are calculated on the basis of the self-consistent Skyrme-Hartree-Fock model. Where the tunneling probability for spontaneous fission is estimated by the WKB approximation. To get the necessary ingredients for this approximation namely the collective masses and the corrected potential energy surface self-consistent cranking is used. The halflife for α-decay are calculated from the Q_α reaction energies using an estimate based on the Viola systematics.

HK 36.27 Mi 14:00 HG Aula

Temperature dependence of the pulse properties and the leakage current of germanium detectors — Allen Caldwell, Daniel Lenz, Jing Liu, Xiang Liu, Bela Majorovitz, and •Oleksandr Volynets for the GERDA-Collaboration — Max-Planck-Institute for Physics, Munich, Germany

High-purity germanium detectors are used in neutrinoless double-beta decay experiments like Gerda as they have very good resolution and act as the detector and the source simultaneously.

Germanium detectors are operated at liquid nitrogen temperatures to reduce the number of electrons in the conduction band. The mobility of the charge carriers is temperature dependent and thus also the rise time of the pulses induced by the drifting charge carriers. Therefore pulse shapes analysis has to take into account possible temperature variations.

Measurements of the temperature dependence of the pulses were made using a high-purity n-type segmented germanium detector. The detector was installed in a vacuum cryostat and cooled through a copper cooling finger submerged in liquid nitrogen. A collimated ^{152}Eu source located at two different positions along the crystal axes 100 and 110 was used. The temperature was monitored using a PT100 resistor installed at the closest possible point to the detector. The pulse properties in the temperature range from 93 to 99 K and the temperature dependence of the leakage current in the temperature range from 85 to 112 K will be discussed.

HK 36.28 Mi 14:00 HG Aula

Die DAQ für das Gerda Myonveto — •Florian Ritter, Dennis Dietrich, Kai Freund, Peter Grabmayr, Alexander Hegai, Josef Jochum, Markus Knapp und Georg Meierhofer für die GERDA-Kollaboration — Kepler Center for Astro and Particle Physics, Eberhard Karls Universität Tübingen, Deutschland

Das Gerda-Experiment [1] möchte den neutrinolosen doppelten Betazerfall des ^{76}Ge nachweisen. Um die nötige Untergrundreduktion zu erreichen, wird unter anderem ein Myonveto entwickelt. Dies besteht aus ca. 20 Plastikszintillatoren und einem Wasser-Cherenkov-Detektor mit 66 Photomultipliern (8"), die den Kryostaten umgeben.

Die Photomultiplier wurden in Tübingen eingekapselt, getestet und im vergangenen Jahr am LNGS in den Wassertank eingebaut. Aufgrund der in Tübingen gemessenen Dunkelraten erfolgte die Gruppierung der einzelnen Photomultiplier im Auslesesystem. Es wurde ein System zur Überwachung der Stabilität der Photomultiplier-Signale entwickelt. Dieses Überwachungssystem, bestehend aus Glasfasern und Diffusor-Bällen, wird ebenso diskutiert wie ein Vorschlag für ein Triggerschema für die auslesenden FADCs.

[1] The GERmanium Detector Array, Proposal to LNGS, 2004. Gefördert vom BMBF (05A08VT1).

HK 36.29 Mi 14:00 HG Aula

Upper limit of ^{83}Rb release into the gas phase from a ^{83m}Kr calibration source for the XENON project — Elena Aprile[1], Francesco Arneodo[2], Laura Baudis[3], Marcus Beck[4], Alfredo D. Ferella[3], Karl Giboni[1], Volker Hannen[4], •Karen Hugenberg[4], Raphael F. Lang[1], Ondrej Lebeda[5], Antonin Spalek[5], Drahos Venos[5], and Christian Weinheimer[4] for the XENON-Collaboration — [1]Columbia University, USA — [2]Gran Sasso National Laboratory LNGS, Italy — [3]Zurich University, Switzerland — [4]Institut für Kernphysik, WWU Münster, Germany — [5]Nuclear Physics Institute, ASCR, Rez, Czech Republic

The isomer ^{83m}Kr with its half-life of 1.83 h is an ideal calibration source for a liquid noble gas dark matter experiment like the XENON project. For such a low counting experiment the possibility that traces of the much longer living mother isotop ^{83}Rb ($t_{1/2} = 86.2$ d) contaminate the detector must be avoided. In this work the ^{83}Rb release of a 1.8 MBq strong ^{83}Rb source embedded in zeolite spheres has been investigated by searching for the characteristic ^{83}Rb γ lines with the ultra-sensitive germanium detector Gator at LNGS after collecting a possible ^{83}Rb release in a cryogenic trap for about 10 days. No signal has been found. The corresponding upper limit for the ^{83}Rb release of 200 μBq means, that such a ^{83}Rb source as ^{83m}Kr generator can be used at the XENON project as well as for the KATRIN experiment. The germanium detector also allowed to set upper limits on the possible release of the isotopes ^{84}Rb and ^{86}Rb, which were produced during the ^{83}Rb production at the Rez cyclotron to some amount.

HK 36.30 Mi 14:00 HG Aula

Systematische Magnetfeldvermessung der differentiellen Pumpstrecke und des Luftspulensystems von KATRIN — •Stefan Zepter für die KATRIN-Kollaboration — Karlsruher Institut für Technologie (KIT), Institut für experimentelle Kernphysik (IEKP)

Ziel des KArlsuher TRItium Neutrino Experiments KATRIN ist die modellunabhängige Bestimmung der Masse des Elektronantineutrinos mit einer Sensitivität von 0,2 eV durch die genaue Vermessung des Endpunktsspektrums der β-Elektronen aus dem Tritiumzerfall. Die adiabatische Führung der Elektronen von der Quelle über eine Transportstrecke zum Spektrometer erfolgt durch starke Magnetfelder die von einer Reihe von supraleitenden Solenoiden erzeugt werden. Die präzise Vermessung der Felder ist wichtig um die Genauigkeit der Feldsimulationen zu überprüfen, auf denen das Design der adiabatischen Führung beruht.

Zur Messung von B-Feldern wurde ein 3D-Messtisch entwickelt, der in der Lage ist große räumliche Bereiche automatisch abzufahren und eine Magnetfeldkarte zu erstellen. Die Messung erfolgt mit Hilfe einer rotierenden Hallsonde.

Damit werden systematische Messungen der Streufelder des Transportstreckenelements DPS2-F und des Luftspulensystems des Hauptspektrometers durchgeführt. Die Messgenauigkeit des 3D-Messtisches wurde bereits durch erste Testmessungen überprüft.

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HK 36.31 Mi 14:00 HG Aula

Plasma effects and ion transport in the KATRIN windowless gaseous tritium source. — •Nikita Titov for the KATRIN-Collaboration — Karlsruhe Institute for Technology, Institute for Nuclear Physics (on leave from INR, RAS, Moscow)

KATRIN is the international experiment currently being assembled at Karlsruhe to measure the absolute value of the electron antineutrino mass at the 0.2 eV level. It will study the shape of the tritium beta decay spectrum near the endpoint with an electrostatic spectrometer with adiabatic magnetic collimation. In order to reduce the systematic uncertainties, a windowless gaseous tritium source (WGTS) will be used to produce at unprecedented number of decay electrons.

The tritium decay rate inside the WGTS is planned at the $1.2 \times 10^{11} sec^{-1}$ level. Together with processes of secondary ionization, thermalization and charge transport this leads to an ion / electron pair density inside WGTS at the 10^7 ... $10^8 cm^{-3}$ level. At the operating temperature 30K these charges will behave as a plasma.

There are two main requirements related to the space charge in the WGTS:

- Electric potential inside WGTS level should be controlled below 50 meV
- Ion transport toward spectrometer should be reduced by a factor 10^{+6}...10^{+7}.

Both issues are addressed by numerical analysis and experimental modeling.

HK 36.32 Mi 14:00 HG Aula

Deconvolution method for determination of the KATRIN energy loss function — Volker Hannen[1], •Christopher Kranz[1], Anna Sejersen Riis[1,2], and Christian Weinheimer[1] for the KATRIN-Collaboration — [1]Institut für Kernphysik, Westfälische Wilhelms-Universität Münster, Germany — [2]Department of Physics and Astronomy, Aarhus University, Denmark

The KATRIN experimental sensitivity to the neutrino mass depends heavily on the proper reduction of systematic errors, one of which stems from incomplete knowledge of the so-called energy loss function.

As the electrons created by tritium beta decay move through the tritium source they may undergo scattering on T2 molecules and, as a consequence, loose energy and change their direction of motion. This process is described by the energy loss function.

Using singular value decomposition methods the energy loss function can be deconvoluted from measurements of the KATRIN response