of the decelerated electrons. Using standard focal plane hodoscopes a photon energy resolution of 0.2-2.2% over the tagging range of 4-82% of the electron beam energy is achieved. The photon flux is determined from geometrically overlapping scintillator channels. Control of the linear polarisation of the photon beam is provided by adequate orientation of a diamond radiator using a commercial goniometer. The measurement of the circular photon beam polarisation requires Møller polarimetry of the longitudinally polarised electron beam. This shall be realised by using polarised ferromagnetic radiator foils and the coincident measurement of the symmetric Møller pairs in a dedicated focal plane detection system.

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HK 22.94 Mo 16:30 TU MA141

Method for (n,γ)-cross section measurements of unstable isotopes — •Stephan Walter[1], Michael Heil[1], Franz Käppeler[1], Ralf Plag[1], and René Reifarth[2] — [1]Forschungszentrum Karlsruhe, Postfach 3640, D-76021 Karlsruhe — [2]LANL, Los Alamos, New Mexiko, 87545, USA

Quantitative studies of s-process nucleosynthesis in Red Giant stars require reliable cross sections for the unstable branching point isotopes. Such data are important with respect to explosive nucleosynthesis in the r- as well as in the p-process. Currently, time of flight (TOF) measurements are limited by the available neutron fluxes, which require target masses in the milligram region, implying severe backgrounds caused by the self activity of the target. We propose to increase the sensitivity of the TOF technique such that target masses of a few micrograms can be used. This is achieved by shortening the flight path to a few centimetres, along with the use of a 4π calorimeter for the detection of neutron capture events.

HK 22.95 Mo 16:30 TU MA141

The ^{14}N(p,γ)^{15}O reaction at energies of astrophysical interest — •Daniel Bemmerer — Istituto Nazionale di Fisica Nucleare, Sezione di Padova, Italy, and Institut für Atomare Physik und Fachdidaktik, Technische Universität Berlin, Germany

The ^{14}N(p,γ)^{15}O reaction is the bottleneck of the hydrogen-burning CNO cycle. At the LUNA 400 kV accelerator deep underground in the Gran Sasso laboratory, its cross section has been measured in the E_{CM} = 130 – 370 keV energy range using a TiN solid target and germanium detectors [1]. The resulting astrophysical S-factor extrapolated to zero energy is only half the previously accepted value, with interesting consequences for the age determination of globular clusters [2].

The present talk reports on the subsequent measurement [3] of the total cross section of this reaction in the E_{CM} = 70 – 230 keV energy range using a windowless gas target and a 4π BGO detector at the LUNA accelerator. The results are consistent with [1] and extend the data to energies that lie within the Gamow peak for some stars.

[1] A. Formicola *et al.*, Phys. Lett. **B 591** (2004), 61 - 68.
[2] G. Imbriani *et al.*, Astronomy & Astrophysics **420** (2004), 625 - 629.
[3] http://edocs.tu-berlin.de/diss/2004/bemmerer_daniel.htm

HK 22.96 Mo 16:30 TU MA141

Measurement of the ^{3}He(α,γ)^{7}Be cross section with ERNA — •Antonino Di Leva for the ERNA collaboration — Institut für Experimentalphysik III, Ruhr-Universität Bochum

The ^{3}He(α,γ)^{7}Be reaction plays an important role in the interpretation of the results of the solar neutrino experiments, since the estimate of the oscillation parameters relies on the solar neutrino spectrum, calculated by solar models. The high energy component in this spectrum is mainly produced by the decay of ^{7}Be and ^{8}B.

However uncertainty in the ^{3}He(α,γ)^{7}Be cross section is also one of the largest contributions to the uncertainty on primordial ^{7}Li abundance in Big Bang Nucleosynthesis calculations. The latter can constrain the universe initial baryon density and the number of light neutrino flavors.

Measurements of the ^{3}He(α,γ)^{7}Be cross section have been performed detecting the capture gamma rays or measuring the activity of the synthesized ^{7}Be. While the results of the two different approaches agree on the energy dependence of the astrophysical S factor, they disagree in the extrapolated $S_{34}(0)$ value at a 3σ level, that suggests the presence of systematic errors in one or both techniques, or a non radiative component in the cross section.

A novel approach uses the European Recoil separator for Nuclear Astrophysics (ERNA), that can provide the simultaneous detection of both the capture gamma rays and the ^{7}Be ions produced in the reaction. In this talk the experiment and results of preliminary measurements are discussed.

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HK 22.97 Mo 16:30 TU MA141

Eine kondensierte ^{83m}Kr-Konversionselektronenquelle für das KATRIN-Experiment — Matthias Prall, Beatrix Ostrick, •Matthias Prall und Beatrix Ostrick für die KATRIN-Kollaboration und die KATRIN-Kollaboration — Institut für Kernphysik Münster

Das KATRIN-Experiment wird $m^2_{\bar{\nu}_e}$ aus dem β-Zerfall von Tritium mit einer Signifikanz von 5 σ für eine Masse von 0,35 eV/c^2, bzw. 3 σ für eine Masse von 0.3 eV/c^2 messen. Für kleinere Neutrinomassen wird es möglich sein, eine Obergrenze von 0,2 eV/c^2 bei 90% CL anzugeben. Hierfür wird der sogenannte MAC-E (magnetic adiabatic collimation followed by electrostatic filter) Filter eingesetzt.

Für die Messung wird der MAC-E Filter mit einer Retardierungsspannung im Bereich von 18,6 kV versorgt. Man muss in der Lage sein, Fluktuationen σ dieser Spannung im Bereich unter 60 meV zu erkennen, da eine unerkannte Fluktuation über die Relation $\Delta m^2_{\bar{\nu}_e} = -2\sigma^2$ die Neutrinomasse verfälschen würde. Uns dienen K-Konversionselektronen von ^{83m}Kr bei 17,8 keV mit einer Breite von 2,9 eV als nuklearer/atomarer Standard zur Langzeitüberwachung der Retardierungsspannung, die parallel an einem Monitor-Spektrometer angelegt wird. Das ^{83m}Kr ist hierbei auf einem Graphitsubstrat aufgefroren. Da die Halbwertszeit von ^{83m}Kr nur 1,8 Stunden beträgt, muss der ^{83m}Kr-Film auf dem Substrat immer wieder erneuert werden. Dies muss so geschehen, dass die Energie der Konversionselektronen reproduzierbar ist.

Wir stellen das zugehörige Gaseinlasssytem und die verschiedenen Filmpräparationsmethoden vor, welche dazu dienen, Reproduzierbarkeit zu erreichen.

HK 22.98 Mo 16:30 TU MA141

Untersuchungen zum p-Prozess radioaktiver Kerne: Mo Isotope als Testfall — •S. Müller[1], M. Babilon[1], K. Sonnabend[1], M. Zarza[1], A. Zilges[1], M. Erhard[2], E. Grosse[2], A. Junghans[2], N. Nankov[2], A. Wagner[2], M. Heil[3], F. Käppeler[3], R. Plag[3], T. Aumann[4], H. Emling[4], H. Simon[4], K. Sümmerer[4] und U. Datta Pramanik[4] — [1]Institut für Kernphysik, TU Darmstadt, D-64289 Darmstadt — [2]Institut für Kern- und Hadronenphysik, FZ Rossendorf — [3]Institut für Kernphysik FZ Karlsruhe — [4]GSI Darmstadt

Es gibt 35 neutronenarme, stabile Kerne welche nur im p-Prozess [1] durch eine Reihe von (γ,n), (γ,p) und (γ,α) Reaktionen erzeugt werden können. Am LAND Aufbau der GSI können die (γ,n) Wirkungsquerschnitte von stabilen und instabilen Kernen durch Coloumbaufbruch in inverser Kinematik untersucht werden [2,3]. In einem ersten Experiment sollen die (γ,n) Wirkungsquerschnitte der Kerne ^{100}Mo, ^{93}Mo und ^{92}Mo gemessen werden. Die Ergebnisse der neuen Methode werden verglichen, indem die Kerne ^{100}Mo und ^{92}Mo zusätzlich mit reellen Photonen [4] an den Strahlungsquellen S-DALINAC und ELBE untersucht werden.

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[1] M. Arnould, S. Goriely, Phys. Rep. 384 (2003) 1
[2] G. Baur *et al.*, Prog. Part. Nucl. Phys. 51 (2003) 487
[3] R. Palit *et al.*, Phys. Rev. C 68 (2003) 034318
[4] K. Sonnabend *et al.*, Phys. Rev. C 70 (2004) 035802

HK 22.99 Mo 16:30 TU MA141

Theoretical Description of a Quenching of the Neutron Channel observed in d+d Reactions within some Host Metals — •Tatiana Dorsch, Konrad Czerski, Peter Heide, and Armin Huke — Institut für Atomare Physik und Fachdidaktik, Technische Universität Berlin, Berlin, Germany

Angular distributions and the neutron-proton branching ratio of the mirror reactions ^{2}H(d,p)^{3}H and ^{2}H(d,n)^{3}He have been investigated using different deuterized metallic targets the projectile energies ranging from 5 to 60 keV. Whereas the experimental results obtained for Al, Zr, Pd and Ta targets do not differ from those known from gas-target experiments, an enhancement of the angular anisotropy in the neutron channel and a quenching of the neutron-proton branching ratio have been observed for Li and Sr targets at deuteron energies below 20 keV. A theoretical analysis of the experimental results has been performed using a parameterization of all possible channel-spin matrix-elements. Assuming an induced polarization of reacting deuterons, the observed asymmetry effects between the neutron and proton channels could be explained within an adiabatic approximation.