Dresden, Germany

In-medium modifications of hadrons can be related to the density dependence of QCD condensates via QCD sum rules. The impact of the renormalization invariant combination $m_q\langle\bar{q}q\rangle$ in QCD sum rules for light vector mesons is numerically small. Instead, four-quark condensates essentially drive the change of spectral properties of light vector mesons embedded in nuclear matter. We present a generic catalog of four-quark condensates and compare the structures appearing in baryon and meson sum rules in the light quark sector. The nucleon self-energies at finite density are revisited and evaluations in this framework are compared to advanced nuclear matter calculations. For the ω-meson, qualitative findings in photoproduction data from the CB-TAPS collaboration are analyzed, cf. [1]. This allows to constrain the density dependence of special combinations of four-quark condensates.
[1] R. Thomas, S. Zschocke and B. Kämpfer, *Phys. Rev. Lett.* **95**, 232301 (2005).

HK 20.7 Di 18:30 C

The phase diagram of the three-flavor quark-meson model — Bernd-Jochen Schaefer[1], •Mathias Wagner[2], and Jochen Wambach[2,3] — [1]Institut für Physik, Karl-Franzens-Universität, A-8010 Graz, Austria — [2]Institut für Kernphysik, TU Darmstadt, D-64289 Darmstadt,Germany — [3]Gesellschaft für Schwerionenforschung GSI, D-64291Darmstadt,Germany

In this talk we present first results of our calculation of the chiral phase diagram of three flavor quark-meson model. The dependence of the phase boundaries on the quark masses is discussed. The results for the in-medium masses of the mesons, the pressue, the quark-number density and chiral susceptibility are compared with other model and lattice calculations. These studies are the basis for a more sophisticated treatment within a functional renormalization group approach.

HK 21: Kern- und Teilchen-Astrophysik

Zeit: Dienstag 17:00–19:00 Raum: E

HK 21.1 Di 17:00 E

First measurements of (γ,α) photodisintegration in ^{92}Mo and ^{144}Sm — •Chithra Nair[1], Roland Beyer[1], Paulo Crespo[1], Martin Erhard[1], Michael Fauth[1,2], Eckart Grosse[1,2], Arnd Junghans[1], Joakim Klug[1], Krasimir Kosev[1], Gencho Rusev[1], Klaus-Dieter Schilling[1], Ronald Schwengner[1], and Andreas Wagner[1] — [1]Institut für Strahlenphysik, Forschungszentrum Dresden-Rossendorf, 01328 Dresden, Germany — [2]Technische Universität Dresden, 01062 Dresden, Germany

Photodisintegration measurements of the astrophysically important p-nuclei ^{92}Mo and ^{144}Sm were performed at the bremsstrahlung facility at ELBE, FZ Dresden-Rossendorf [1]. In particular the (γ,α) reactions of the mentioned nuclei were studied for the first time using the photoactivation technique at different endpoint energies above and close to the threshold. First experiments of short-lived decays following the reaction ^{144}Sm(γ,n) using the newly built pneumatic delivery system will also be discussed. The activation yields for all measurements are compared with calculations using cross sections from recent Hauser-Feshbach models [2].
[1] R. Schwengner *et al.*, NIM A 555 (2005) 211
[2] M. Erhard *et al.*, PoS (NIC-IX) 056 (2006)

HK 21.2 Di 17:15 E

Experimente mit reellen Photonen zur Nukleosynthese schwerer Elemente: Statusbericht — •Jens Hasper, Linda Kern, Philipp Lang, Sebastian Müller, Kerstin Sonnabend und Andreas Zilges — Institut für Kernphysik, TU Darmstadt, 64289 Darmstadt

Die experimentelle Untersuchung von Photodisintegrationsreaktionen liefert wichtige Daten für stellare Modellrechnungen zur Nukleosynthese schwerer Elemente. Zum einen stellt die Photodisintegration den maßgeblichen Reaktionsmechanismus im p-Prozess dar [1]. Mit experimentell ermittelten Reaktionsraten werden die Unsicherheiten von stellaren Netzwerkrechnungen verkleinert. Zum anderen können auch die Fehlerschranken von Neutroneneinfangquerschnitten innerhalb des s-Prozesses mit Hilfe des Prinzips des detaillierten Gleichgewichts über die Bestimmung von Photodisintegrationswirkungsquerschnitten verringert werden. Von besonderem Interesse ist dies für die Verzweigungskerne, die Informationen über die thermodynamischen Randbedingungen während des s-Prozesses liefern, aber in Neutroneneinfangsexperimenten auf Grund ihrer Instabilität experimentell nur vereinzelt studiert werden können. Mittels Photoaktivierung wurden am S-DALINAC bereits zahlreiche Isotope untersucht (siehe z.B. [2]). Die experimentellen Ergebnisse kürzlicher Messungen werden vorgestellt und mit theoretischen Modellen verglichen.
*Gefördert durch die DFG (SFB 634)
[1] H. Utsunomiya et al., Nucl. Phys. A 777 (2006) 459
[2] S. Müller et al., Phys. Rev. C 70 (2004) 035802.

HK 21.3 Di 17:30 E

Neutrino nucleosynthesis of the exotic nuclei ^{138}La and ^{180}Ta by charged current reactions* — •A. Byelikov for the LaTa-Collaboration — Institut für Kernphysik, TU Darmstadt

The nucleosynthesis of the exotic heavy odd-odd nuclides ^{138}La and ^{180}Ta, amongst the rarest in nature, is a long-standing problem. Both are shielded against the r-process, and ^{138}La is bypassed in the s-process, while production of ^{180}Ta may be possible through neutron capture on the long-lived ^{179}Ta [1]. The p-process has been suggested as a source of ^{180}Ta, but ^{138}La is significantly underproduced in all reasonable scenarios. Another possible source are charged-current neutrino-nucleus reactions [2] of the type (ν_e, e^-) which would be dominated by the GT$_-$ response. The main GT$_-$ resonance lies above the particle threshold and, therefore, does not contribute. At present, the modelling is based on (1p-1h) RPA calculations only, whose capability to describe the response below the main GT resonance is questionable. However, the corresponding GT$_-$ strength distributions can be measured with high resolution even in heavy nuclei utilizing the (^{3}He,t) reaction at intermediate energies under 0°. Measurements of the ^{138}Ba(^{3}He,t)^{138}La and ^{180}Hf(^{3}He,t)^{138}Ta reactions have been performed at RCNP, Osaka. The final B(GT) strength distributions and their astrophysical implications are presented.
[1] F. Käppeler et al., Phys. Rev. C **69**, 055802 (2004).
[2] A. Heger et al., Phys. Lett. B **606** 258 (2005).

*Supported by the DFG through SFB 634 and 446 JAP-113/267/0-1.

HK 21.4 Di 17:45 E

The (n,n') cross section of ^{187}Os at 30 keV — •Marita Mosconi[1], Michael Heil[1], Franz Käppeler[1], Alberto Mengoni[2], and Ralf Plag[1] — [1]Forschungszentrum Karlsruhe, Karlsruhe, Germany — [2]International Atomic Energy Agency, Vienna, Austria

The inelastic neutron scattering cross section of ^{187}Os for the first excited level (9.75 keV above the ground state) is important for evaluating the age of the universe via the Re/Os cosmochronometer. This information is required for calculating the competition between neutron capture and scattering under stellar conditions. The ^{7}Li(p,n)^{7}Be reaction at threshold has been used for producing 30 keV neutrons with less than 10 keV FWHM. Inelastic scattering events were detected by three ^{6}Li glass detectors at 90, 120 and 270 degree with respect to the neutron beam. The measurement has been performed with isotopically enriched ^{187}Os and ^{188}Os samples. Detailed GEANT simulations of the full experiment setup were employed for the determination of various corrections. The results are compared to previous data and to theoretical predictions.

HK 21.5 Di 18:00 E

Zukünftige Experimente zur Nuklearen Astrophysik am S-DALINAC* — •Kerstin Sonnabend, Jens Hasper, Linda Kern, Anne Sauerwein, Deniz Savran und Andreas Zilges — Institut für Kernphysik, TU Darmstadt, D-64289 Darmstadt

Am Niederenergie-Photonen-Messplatz des S-DALINAC werden (γ,n)-Reaktionsraten für *p*-Prozess Netzwerkrechnungen mittels Photoaktivierung bestimmt [1]. Außerdem werden theoretische Vorhersagen der Neutroneneinfangquerschnitte von Verzweigungskernen im *s*-Prozess mittels der inversen (γ,n)-Reaktion eingeschränkt [2].

Werden sehr langlebige Kerne oder solche mit sehr kleinen γ-Zerfalls-