# HK 28 Instrumentation und Anwendungen

Zeit: Dienstag 14:00–16:00 Raum: TU MA041

## Gruppenbericht

HK 28.1 Di 14:00 TU MA041

**The Super-FRS project at GSI** — •Martin Winkler for the Super-FRS collaboration and the NUSTAR collaboration — GSI Darmstadt

Since more than a decade the GSI projectile fragment separator FRS has successfully demonstrated the research potential of in-flight separators at relativistic energies. To overcome the limitations of this facility the next–generation large scale European in–flight facility is presently planned at GSI. It will provide primary beams of all projectiles up to uranium accelerated up to 2 GeV/u. The maximum intensities of these projectiles beams will be (1-3)$\times 10^{12}$/s depending on the energy, mass and charge state.

The new fragment separator, the Super-FRS, is a super conducting large acceptance device with multiple degrader stages providing spatially separated rare-isotope beams for:

1) the high-energy branch (B$\rho_{max}$ = 20 Tm) including a high–resolution spectrometer to perform reaction studies

2) the low-energy branch (B$\rho_{max}$ = 10 Tm) for spectroscopy with energy-bunched rare isotope beams

3) the ring branch (B$\rho_{max}$ = 13 Tm) for precision experiments with stored and cooled beams,including reactions with light hadrons and electrons.

In this contribution we present the main characteristics of the Super-FRS and the present status of the design studies.

## Gruppenbericht

HK 28.2 Di 14:30 TU MA041

**Towards the HESR at FAIR: Machine experiments at COSY** — •Raimund Tölle for the HESR team collaboration — Forschungszentrum Jülich

The synchrotron and storage ring COSY can store protons from 300 MeV/c and deuterons from 535 MeV/c and accelerate to 3700 MeV/c. The possibility to perform experiments with polarized or unpolarized protons / deuterons (in this momentum range) combined with enhancing the beam quality by electron and stochastic cooling is unique in Europe.

The High Energy Storage Ring (HESR) of the Facility for Antiproton and Ion Research (FAIR) which is planned at the GSI in Darmstadt will be equipped with electron and stochastic cooling as well. It shall be contributed to FAIR by a consortium of the COSY group of the Research Center Juelich, Uppsala University, and GSI. To meet the demanding requirements for this 1.5 GeV/c - 15 GeV/c antiproton storage ring with its two user modes (high luminosity mode or high resolution mode) the validity of several theoretical simulation codes has to be checked. The HESR will be described and the feasibility of benchmarking experiments at COSY in the fields of electron cooling, stochastic cooling, high harmonic cavity, polarisation build-up via spin transfer will be discussed.

HK 28.3 Di 15:00 TU MA041

**Concept for a RICH detector for the CBM experiment at the future accelerator facility FAIR at GSI in Darmstadt** — •Claudia Höhne for the CBM collaboration — GSI Darmstadt

At the future Facility for Antiproton and Ion Research in Darmstadt (FAIR) a dedicated heavy-ion experiment investigating the properties of highly Compressed Baryonic Matter is proposed (CBM). Investigating heavy-ion collisions at beam energies from 15 to 35 AGeV, its goal will be to explore the QCD phase diagram in the region of moderate temperatures but very high baryon densities. A key observable of the physics program will be a precise measurement of low-mass vector mesons in their leptonic decay channel.

The essential experimental tool for identifying the decay electrons will be a gaseous RICH detector positioned after a system of silicon tracking stations which are located inside a magnetic dipole field. The concept of this RICH detector including first simulations will be introduced and discussed.

HK 28.4 Di 15:15 TU MA041

**Untersuchungen zur APD-Auslese von Szintillationskristallen** — •Helena Nowak für die PANDA-Kollaboration — Ruhr-Universität Bochum, Institut für Experimentalphysik I

Der Entwicklungsstand verschiedener Photodetektoren für die Auslese des elektromagnetischen Kalorimeters des PANDA-Detektors wird vorgestellt. Außerdem werden die Ergebnisse der durchgeführten Testmessungen zur Ermittlung der Energieauflösung sowie der Temperaturabhängigkeit der Lichtausbeute der Kristalle präsentiert. Desweiteren werden Ergebnisse der Untersuchung zur Strahlenhärte der verwendeten APDs (Avalanche Photodioden) diskutiert.

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HK 28.5 Di 15:30 TU MA041

**FURIOS - Eine universelle Laserionenquelle für exotische Spezies** — •Thomas Kessler[1], Iain Moore[1], Ben Tordoff[2], Juha Äystö[1], John Billowes[2] und Klaus Wendt[3] — [1]IGISOL,Universität Jyväskylä, Finnland — [2]Nuclear Physics Group, Manchester University, England — [3]AG Larissa, Universität Mainz, Deutschland

Der Isotopen-Separator der Universität Jyväskylä (Finnland) bietet die Möglichkeit der On-line-Erzeugung und Untersuchung von Radionukliden. Durch den Einsatz der IGISOL-Technik (Ion Guide Isotope Separator On-Line) in Verbindung mit einem Buncher-Cooler-System kann ein breites Spektrum bis hin zu refraktären, kurzlebigen Elementen abgedeckt werden. Zur Steigerung von Effizienz und Selektivität der Isotopenproduktion ist der Aufbau einer Laserionenquelle (RILIS - Resonance Ionization Laser Ion Source) geplant. Um eine möglichst große Anzahl verschiedener Atome resonant zu ionisieren, wird ein flexibles Lasersystem benötigt. Daher ist für das FURIOS-Projekt (Fast Universal Resonant Ion Source) der Aufbau eines gemischten hochrepetierenden (10 kHz) Lasersystems aus Farbstoff-Lasern und Ti:Saphir-Lasern in der Vorbereitungsphase. Der Vortrag präsentiert nebem dem experimentellen Aufbau die ersten Ergebnisse der Laserionisation und gibt einen Ausblick auf geplante Experimente.

HK 28.6 Di 15:45 TU MA041

**Commissioning of TRI$\mu$P Separator and Production of $^{21}$Na** — E. Traykov, G.P.A. Berg, U. Dammalapati, S. De, P. Dendooven, O. Dermois, O. Versolato, K. Jungmann, H.H. Kiewiet, A. Rogachevskiy, M. Sohani, C.J.G. Onderwater, L. Willmann, H.W. Wilschut, •E. Traykov, G.P.A. Berg, S. De, P. Dendo oven, O. Dermois, O. Versolato, K. Jungmann, H.H. Kiewiet, A. Rogachev skiy, M. Sohani, C.J.G. Onderwater, and H.W. Wilschut — Kernfysisch Versneller Instituut, Rijksuniversiteit Groningen, The Netherlands

The TRI$\mu$P separator is the first part of the TRI$\mu$P facility at KVI, the purpose of which is to separate specific rare isotopes that will be produced using the cyclotron AGOR via fragmentation and fusion evaporation and other reactions at energies of 8 - 70 MeV/nucleon. In particular rare isotopes that are needed for high precision studies to search for physics beyond the standard model are of interest. The separator was installed, commissioned and tested in both the "fragmentation mode" and the "gas-filled recoil mode " to allow efficient collection of heavy isotopes with large charge state distributions. After successful commissioning, we produced as a first isotope a very clean $^{21}$Na beam using the (p,n) reaction in reverse kinematics. This isotope was used in a first experiment with the purpose of measuring very precisely the $\beta$ decay branching ratio of $^{21}$Na.