Contribution ID: **43** Type: **Oral**

Experiments at the frontiers of nuclear physics: pilot experiments of the Super-FRS Experiments Collaboration

Tuesday 26 October 2021 10:30 (30 minutes)

The future FAIR facility will comprise the superconducting fragment separator (Super-FRS) as one of its main scientific instruments. This magnetic high-resolution spectrometer, coupled to the heavy-ion synchrotron complex SIS-18/SIS-100, will be the central device of the NuSTAR collaboration for research with exotic nuclei. Together with new detector systems for particle tracking, particle identification, beam profile and intensity monitoring, it will be used for transmitting the produced and separated isotopes to downstream end stations at the exits of its three branches; besides, it can also be used as a stand-alone experimental device with ancillary detectors as a versatile high-resolution spectrometer system for exotic nuclei over a large energy range up to 1,500 MeV/u. The various magnetic sections of the Super-FRS can be operated as dispersive, achromatic or dispersion-matched spectrometer units which are ideally suited to measure the momentum distributions of secondary reaction products with high resolution and precision. In this energy range and with this flexibility, the Super-FRS is a worldwide unique instrument and allows for a variety of novel experiments. Taking advantage of new stages and ion-optical modes, it also allows for a continuation and extension of preceding experiments at the existing FRS. Already today, pilot experiments are carried out by the (Super-)FRS Experiment Collaboration at FRS as preparatory stage in FAIR Phase-0 in order to develop and test new instrumentation. This contribution will present an overview of recent experiments such as the search for new isotopes, basic atomic collision studies, precision mass measurements, studies of hypernuclei, the spectroscopy of mesons bound to nuclei and rare decay modes like multiple-proton emission. Opportunities for new co-operations will be shown, and interested scientists will be invited to join these activities.

Author: SCHEIDENBERGER, Christoph (GSI Darmstadt; JLU Giessen)

Presenter: SCHEIDENBERGER, Christoph (GSI Darmstadt; JLU Giessen)

Session Classification: Session 4