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Radioactive Beams at FAIR - the NUSTAR programme

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The FAIR (Facility for Antiproton and Ion Beams) installations, to be constructed at the GSI site in Darmstadt, will be addressing a wealth of outstanding questions within the realm of subatomic, atomic and plasma physics through a combination of novel accelerators, storage rings and innovative experimental set-ups. One of the key installations is the fragment separator Super-FRS that will be able to deliver an unprecedented range of radioactive ion beams (RIBs) in the energy range of 0-1.5 GeV/u. These beams will be distributed to three branches, each with its unique domain with respect to beam energies and properties. The high-energy branch will permit reactions with radioactive beams at relativistic energies, whereas the low-energy branch will supply decelerated beams for high-resolution spectroscopy, traps and laser spectroscopy. Finally, the ring branch will uniquely permit stored and cooled exotic beams for a range of methods only possible in a storage ring. This ambitious programme is exploited within the NUSTAR (Nuclear Structure, Astrophysics and Reactions) programme. Consequently, a broad experimental programme utilising these beams are envisaged, under the umbrella of the NUSTAR (Nuclear Structure, Astrophysics and Reactions) collaboration. The FAIR facility will be presented with emphasis on the NUSTAR programme in the _rst part to be realized, the modularized start version (MSV) but with an outlook towards intermediate opportunities and short- and long-term extensions. The experimental methods and the associated instrumentation are currently being constructed and/or developed, partially through combining prototype tests and pilot experiments with the running scienti_c programme at GSI.

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