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**FAIR, the Universe in the Lab**

We live a very exciting moment for our understanding of the Universe. A whole new way of observing the Universe is developing, with new instruments which extend in a remarkable way our capabilities, and bring us in the realm of multi-messenger astronomy. Yet, most of the processes to be studied are fundamentally nuclear processes, and the indispensable complement of the observation are experiments in controlled conditions in the laboratory. FAIR allows scientists to perform such experiments, thanks to its unique complex of accelerators, storage rings and experimental apparatus. FAIR will be a world hub for nuclear astrophysics, but its very broad research program will span from material science and biophysics to atomic and plasma physics, hadron structure and fundamental interactions, strongly interacting matter at extreme densities and nuclear structure. Over 3000 scientists from more than 50 countries are working now to exploit the FAIR potential for discovery. In the meantime, the construction of the FAIR facility is proceeding rapidly. The tunnel for the SIS 100 accelerator is complete, and the realization of the experimental halls advances. The installation of the technical infrastructure is in full swing. The components of the accelerators of the future facility are in production and are arriving progressively on the campus of the GSI Helmholtzzentrum for Heavy-Ion Research in Darmstadt, Germany. While the full science potential of FAIR can only be harvested once the new suite of accelerators and storage rings is completed and operational, some of the detectors and instrumentation are already available and are used for a precursor science program called FAIR Phase-0, exploiting also the significantly upgraded GSI accelerator chain. The program has started in the summer of 2019 and continues with a few months of beam time per year. The progress of the FAIR realization and the status as well as prospects of science at FAIR and in the precursor Phase-0 program will be presented.