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Present and future of HISPEC/DESPEC

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The HISPEC (High-resolution in-flight spectroscopy) and DESPEC (Decay spectroscopy) projects are part of the core experimental facility at FAIR. They are aimed at nuclear structure and reaction studies, using high-resolution gamma-ray spectroscopy as their main tool. HISPEC/DESPEC will get information on the force acting between the nucleons inside the nucleus, with special emphasis on systems with exotic proton-to-neutron ratios: both proton rich and neutron rich nuclei. In extreme neutron-rich nuclei radical changes in their structure are expected with the possible disappearance of the classical shell gaps and magic numbers and the appearance of new ones. They are also highly relevant for nuclear astrophysics, especially on the nucleosynthesis of elements heavier than iron. HISPEC/DESPEC will use radioactive beams delivered by to the Low Energy Branch (LEB) of the Super Fragment Separator with energies of 3-150 MeV/u for reaction studies or stopped and implanted beam species for decay studies. The project focuses on those aspects of nuclear investigations with rare isotope beams which can be uniquely addressed with high-resolution setups. Experiments using the same techniques were successfully performed at the for-runner RISING project at the existing GSI. Some HISPEC and DESPEC detectors are already in the production phase, with the first commissioning experiments taking place in 2010. A range of experiments are planned for 2010 onwards employing devices such as the European Germanium tracking array AGATA for gamma-ray detection, and the LYCCA (Lund-York-Cologne Calorimeter) array for the identification of reaction products.
The physics case of HISPEC/DESPEC, the experimental setup, the opportunities opened are discussed.

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