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ARGOS –a nuclear spin orientation setup for electromagnetic moment- and nuclear spin studies

Nuclear electromagnetic moments provide key information for a deeper understanding of nuclear structure. Magnetic dipole moments are highly sensitive to the single-particle configurations of nuclei, while electric quadrupole moments are fingerprints of the nuclear deformation. Furthermore, reliable determination of spin and parity assignments is essential for interpreting nuclear structure. All these studies rely on obtaining information about nuclear spin orientation. This can be achieved either by orienting the entire nuclear ensemble through polarization or alignment, or by exploiting angular correlations such as β–γ or γ–γ correlations for the nuclear states of interest.
The experimental requirements for nuclear moment and spin determination studies can be combined within a single setup. The ARGOS (Array for β and γ Radiation Geometry and Spin studies) system is foreseen to integrate an array of $LaBr_3$ detectors, a permanent magnet providing a homogeneous magnetic field of up to 0.4 T, and a host ladder enabling rapid exchange of implantation media. The design concept of the setup will be presented together with its expected performance. Requirements on beam characteristics and the first envisaged physics cases will be discussed as well.

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