

# Scintillator-Based High-Energy Ion Detectors for the FISIC Project

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The FISIC experiment ("Fast Ion-Slow Ion Collisions") constitutes a novel attempt to better understand the ion-ion interactions occurring in the so-called intermediate collision regime, where the speed of the active electrons is comparable to the relative target-projectile speed. Under these conditions, the cross sections of the involved charge-exchange processes are largest, and of similar magnitude across multiple interaction mechanisms. Previous attempts to gain insights into the intermediate regime have been hindered by both the intricate theoretical treatment as well as the challenging task of separating different interaction paths in experiment. The FISIC experiment, planning to use intense ion beams at the SPIRAL2 and FAIR facilities, aims to shed some light on the details of the interactions taking place.

A major challenge of this experiment is the development of ion detectors that can sustain the expected count rates of some MHz and ion energies ranging from sub-MeV/u to 15 MeV/u. Conventional sensors, such as devices based on semiconductors or plastic scintillators, are unlikely to be able to cope with the radiation damage incurred. One of the solutions investigated utilizes YAP:Ce crystal scintillators, a material which has been successfully employed for ion detection in earlier investigations. After a general overview of the FISIC project, this contribution will detail first investigations into the feasibility of a scintillator sensor system.

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