R3B SIMULATION FOR CALIFA IN PHOSWICH CONFIGURATION

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The R3B (Reaction with Relativistic Radioactive Beams) experiment of the FAIR (Facility for Antiproton and Ion Research) has as main objective the investigation of reactions with highly unstable exotic nuclei and high momentum transfer. It is focused on the determination of the structure and the nuclear dynamics of products emitted in reactions at relativistic energies.

With the purpose of achieving the best experimental results and understanding physical nuclear processes obtained in the R3B experiments at FAIR, different simulation tools. We are here focusing on the R3Broot framework, a novel simulation tool under development, that is built on ROOT, C++ and QT-frame and makes possible the use of different montecarlo codes as GEANT3, GEANT4 and FLUCA.

In this work we present a solution for the Forward End Cap of the CALIFA calorimeter. Specifically will be discussed the integration of different crystal geometries in R3BRoot and its physical behaviour when different nuclear particles and gammas are launched. In detail, we will show simulation of high energy protons (150-180 Mev) interacting in a phoswich crystal configuration composed of LaBr and La Cl crystals coupled together.

The Phoswich solution for the End cap with its pro and cons will discussed in details. A first simulation approach, an optical photonic conversion in this configuration is also presented.