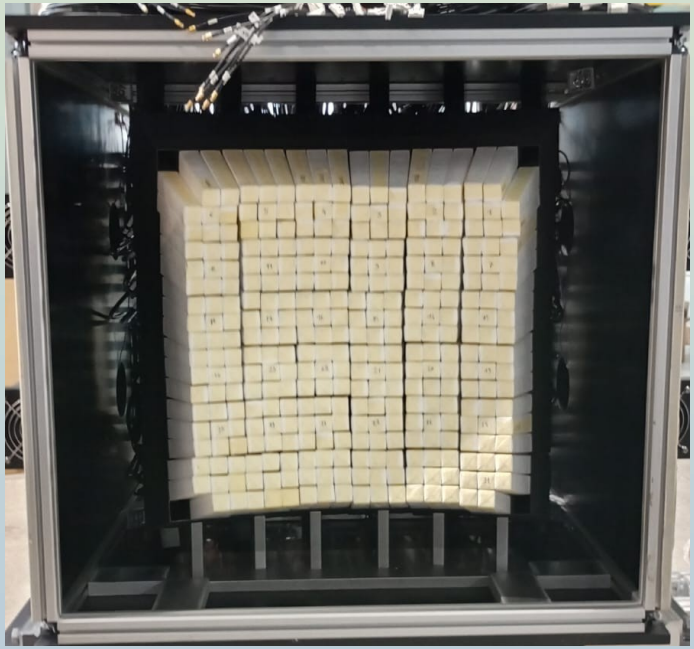
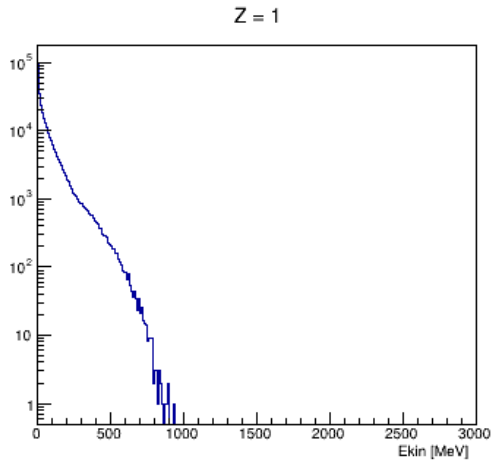
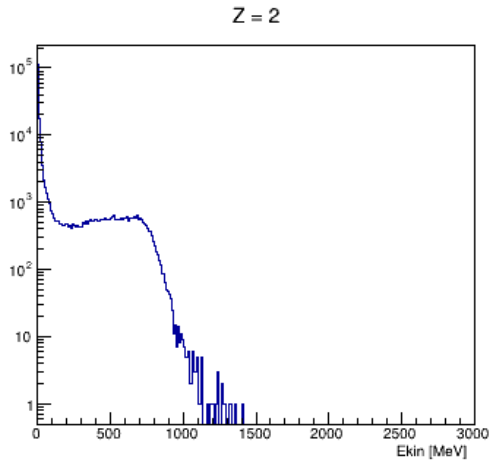
CALO efficiency @ CNAO 2024 – MC analysis

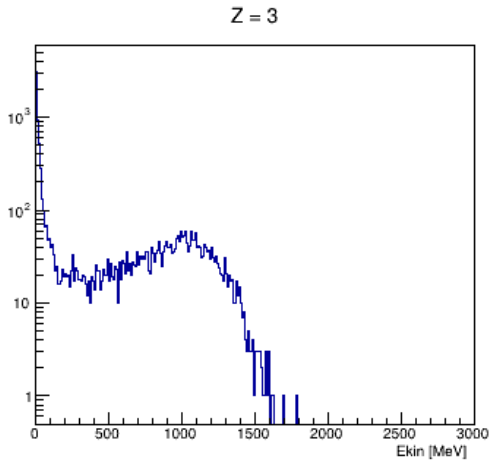
B. Spadavecchia on behalf of the FOOT Turin group

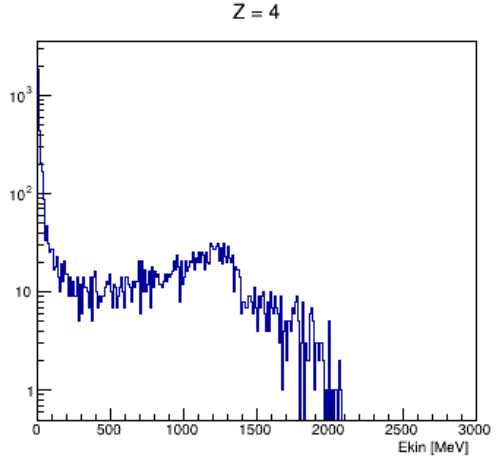


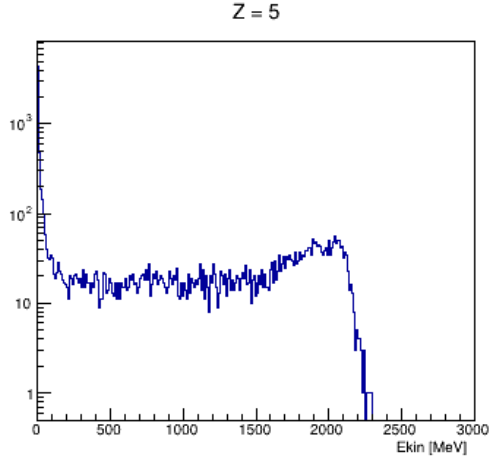
In-production energy for all fragments

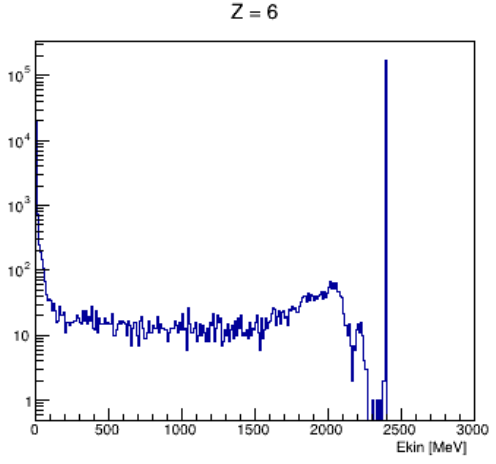




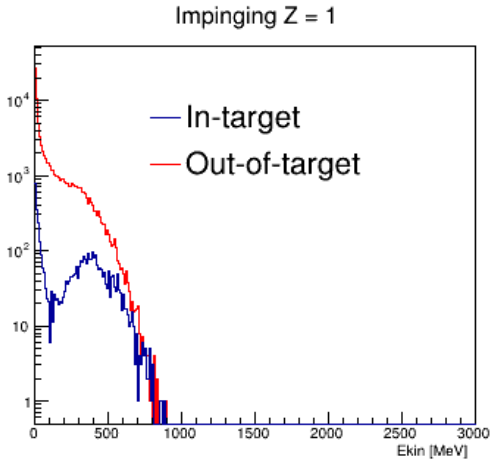


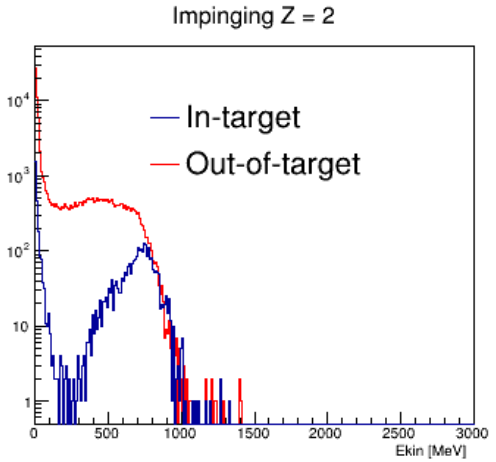


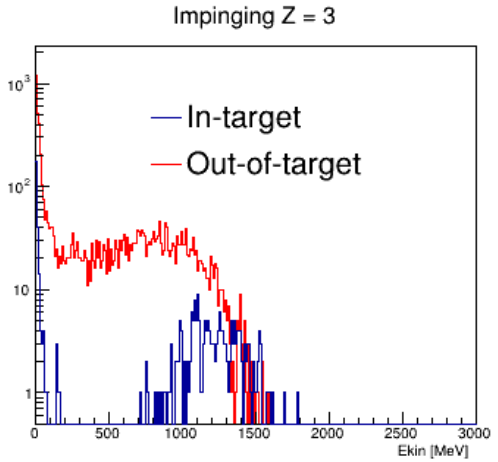


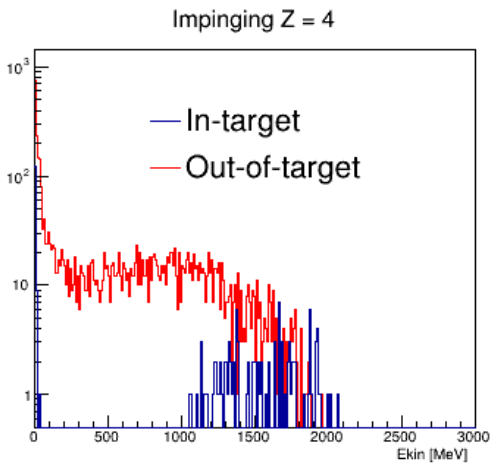


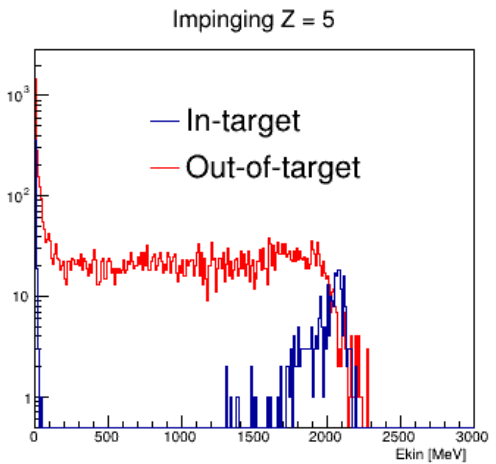
In-production energy for impinging fragments

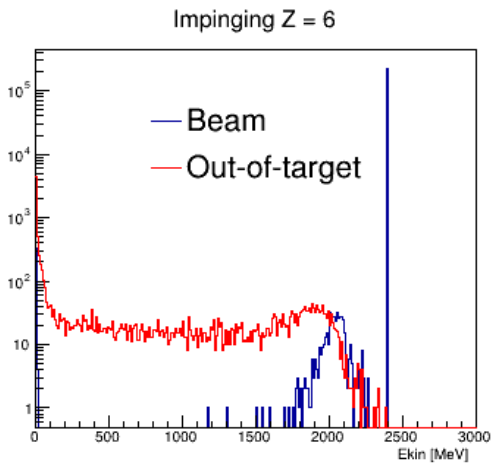




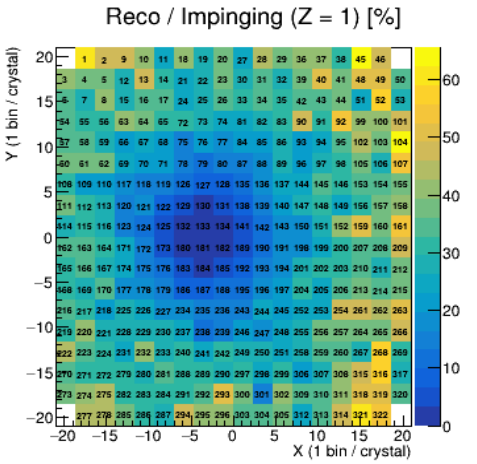


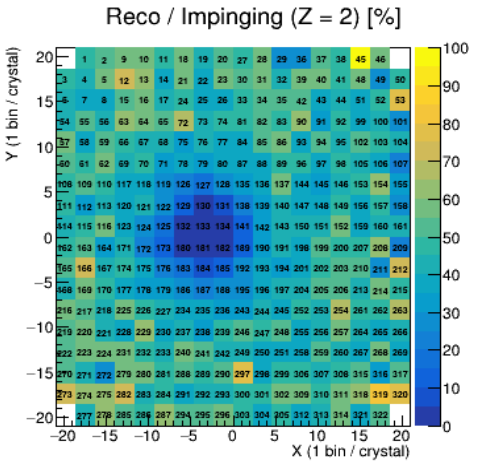


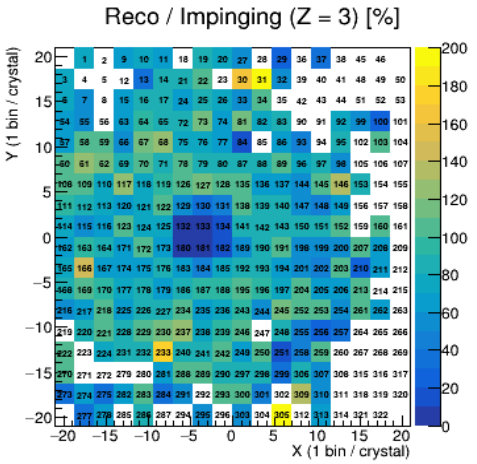


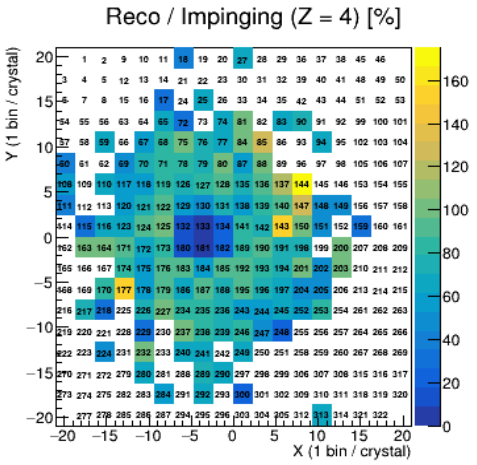


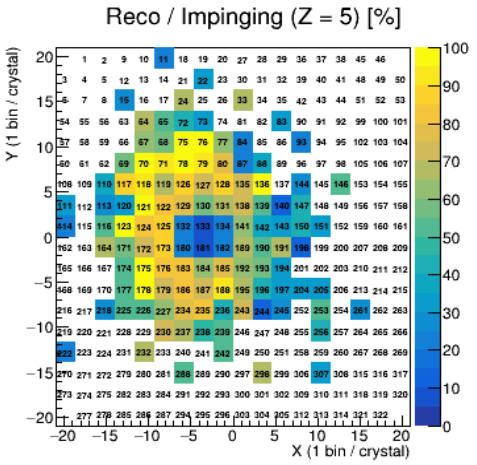
Fraction of identified Z wrt position - MC

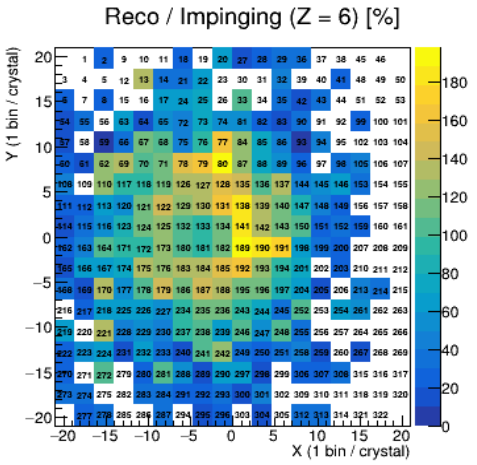




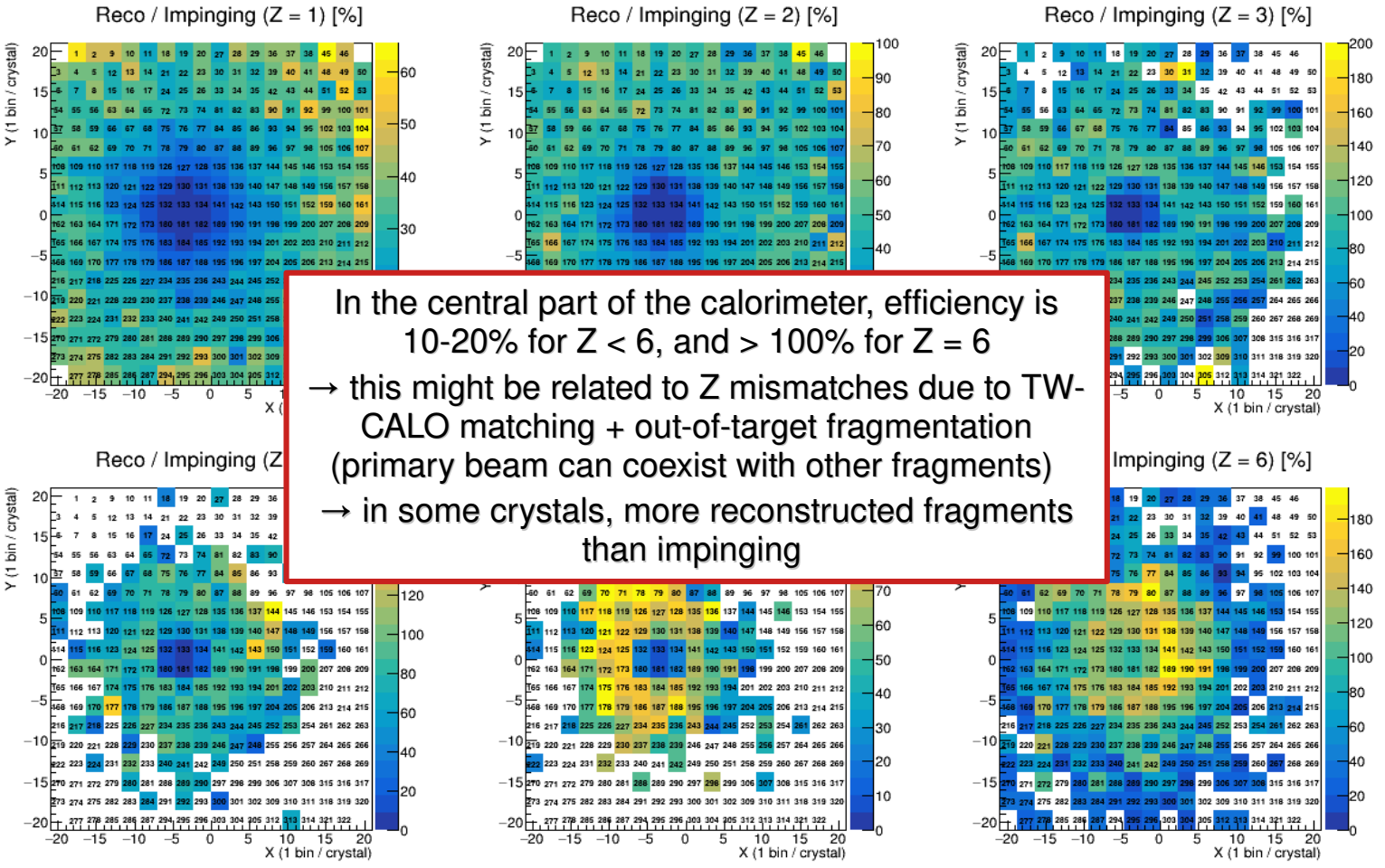








Fraction of identified Z wrt position - MC

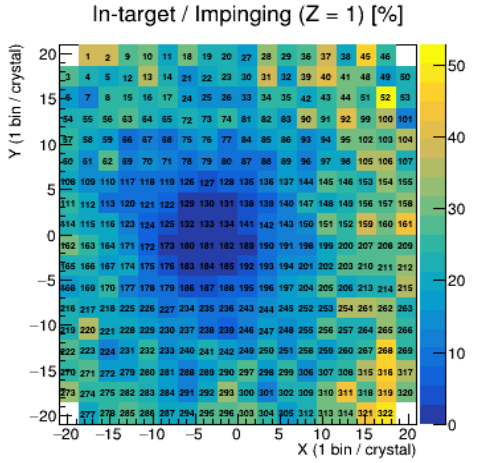


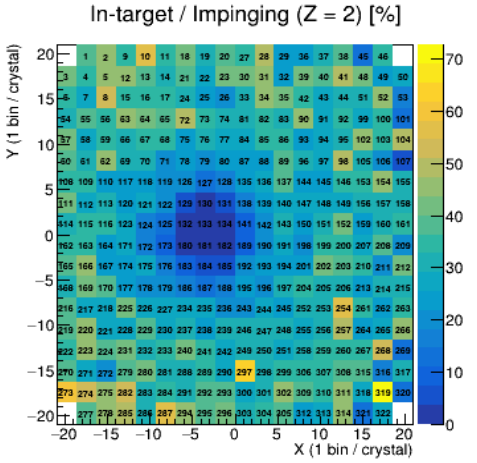
In the central part of the calorimeter, efficiency is 10-20% for Z < 6, and > 100% for Z = 6

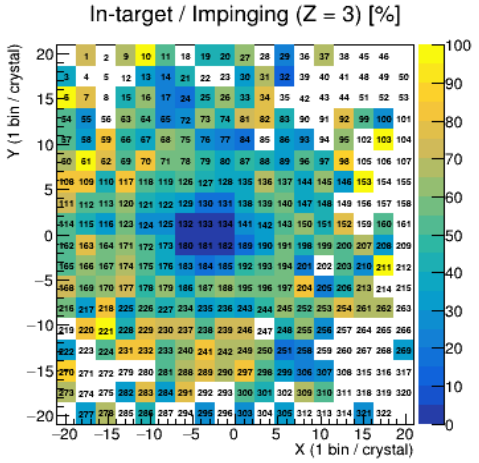
→ this might be related to Z mismatches due to TW-CALO matching + out-of-target fragmentation (primary beam can coexist with other fragments)

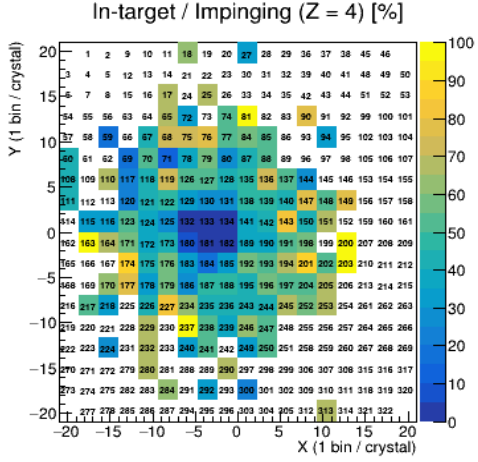
→ in some crystals, more reconstructed fragments than impinging

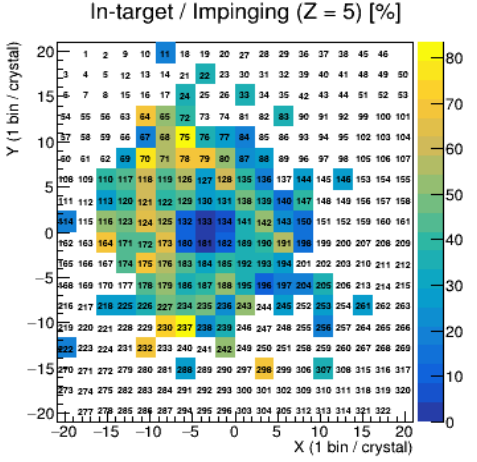
In-target fraction wrt position and Z - MC

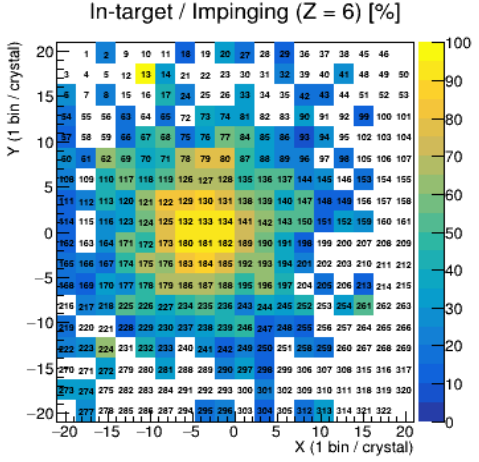




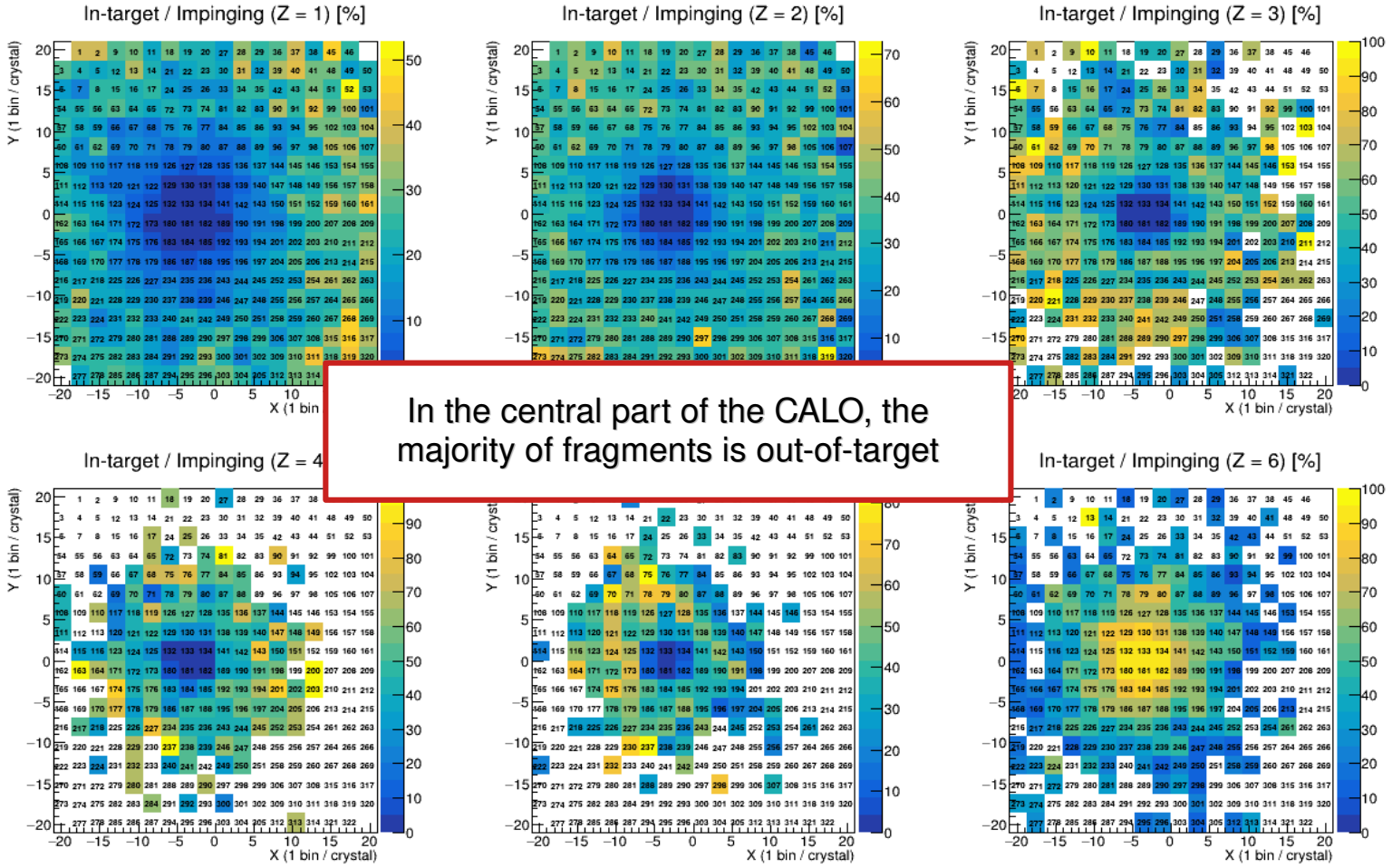




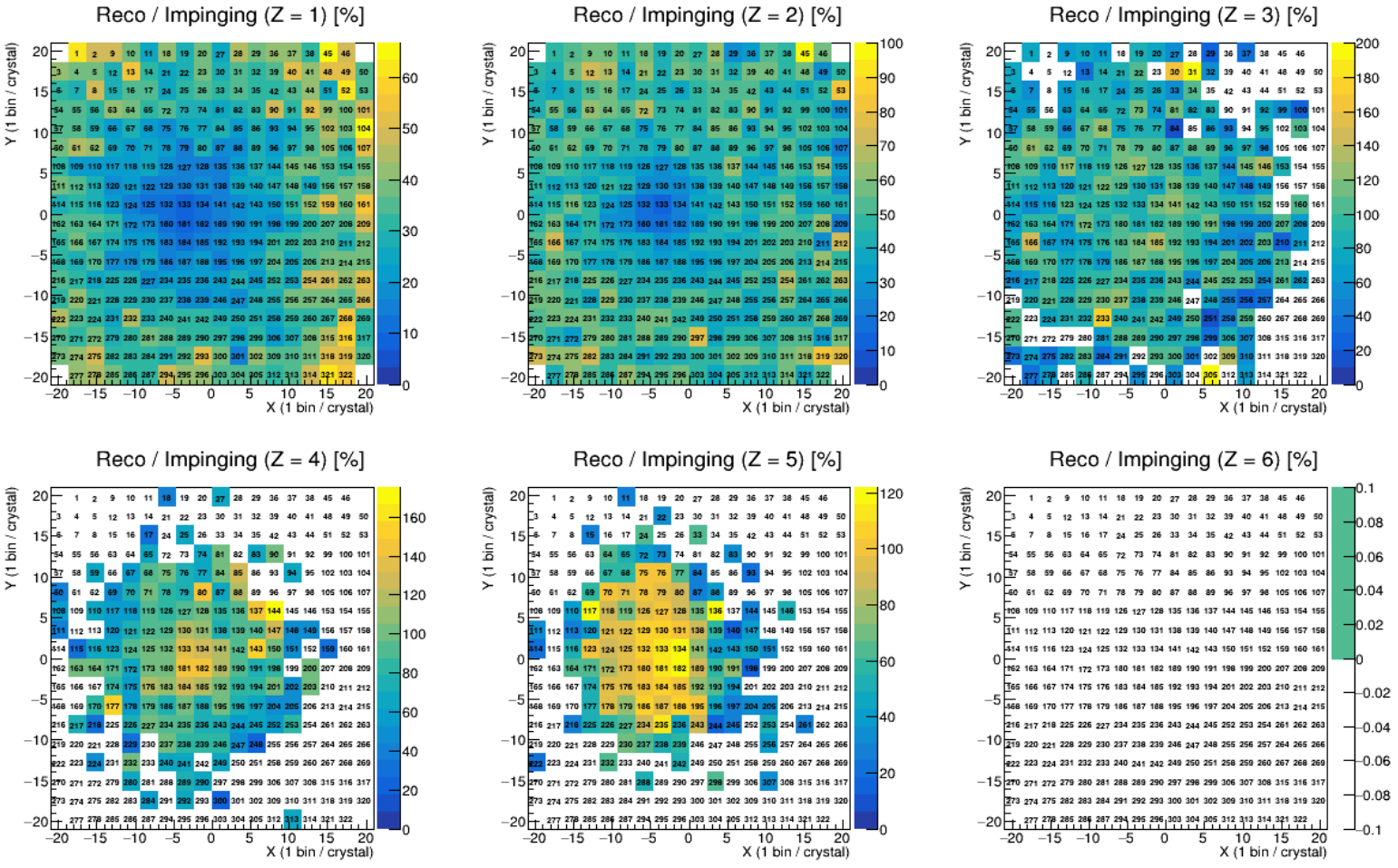




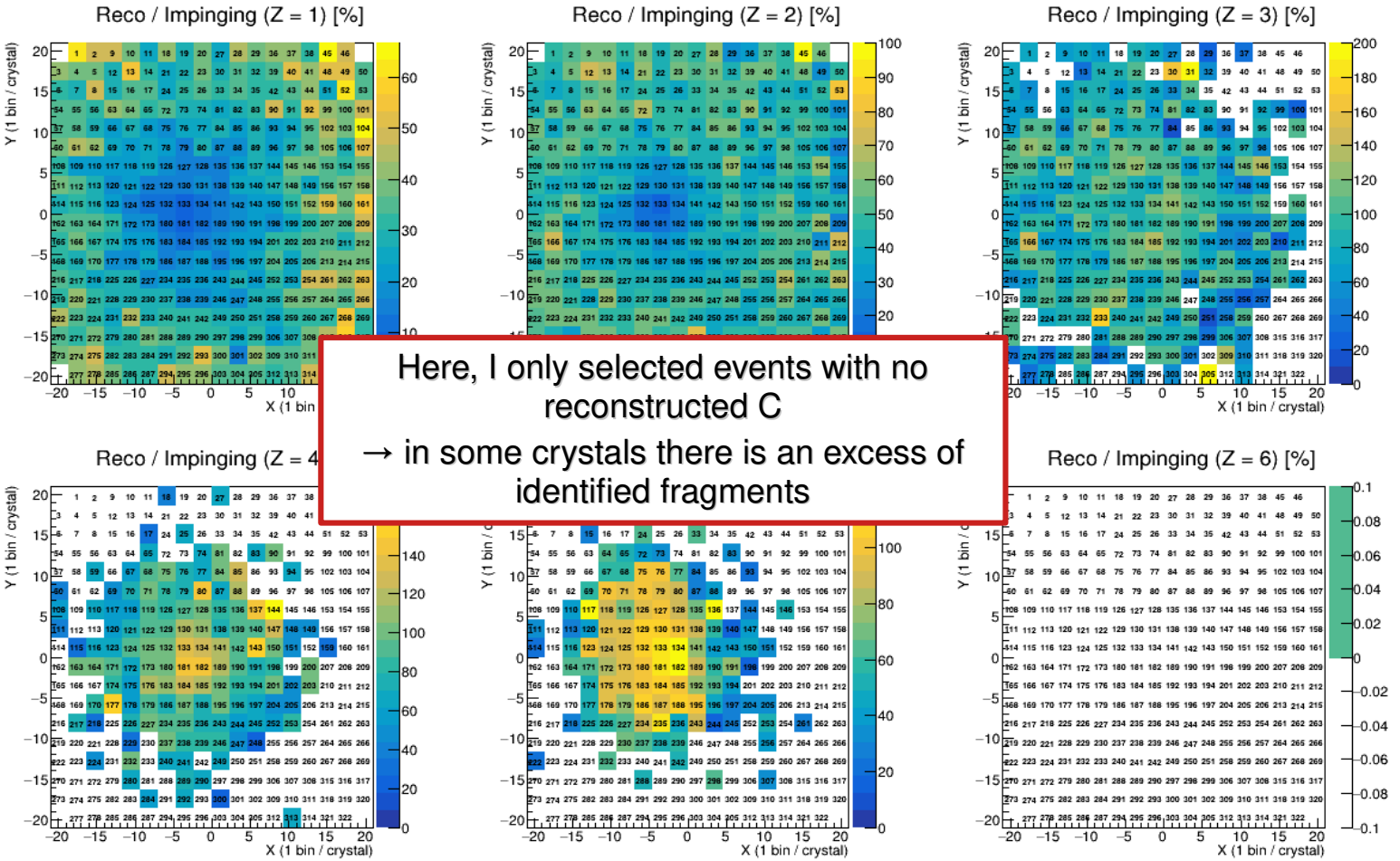
In-target fraction wrt position and Z - MC



Removal of reconstructed C - MC



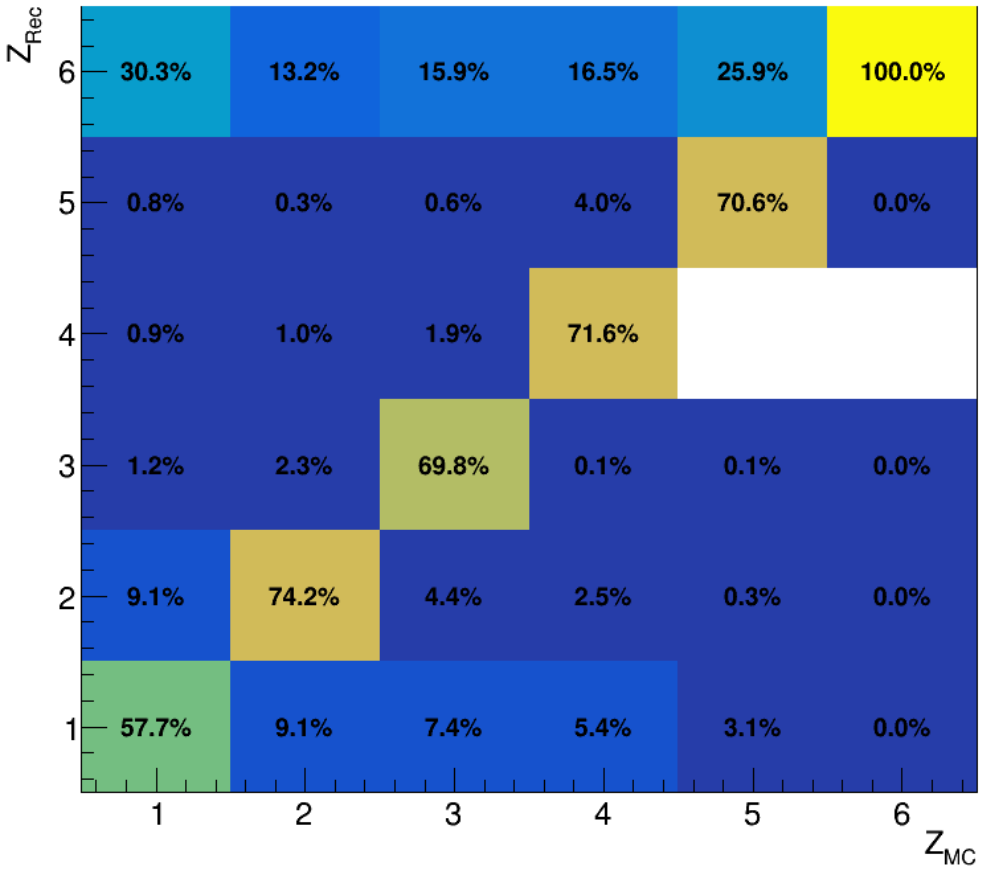
Removal of reconstructed C - MC



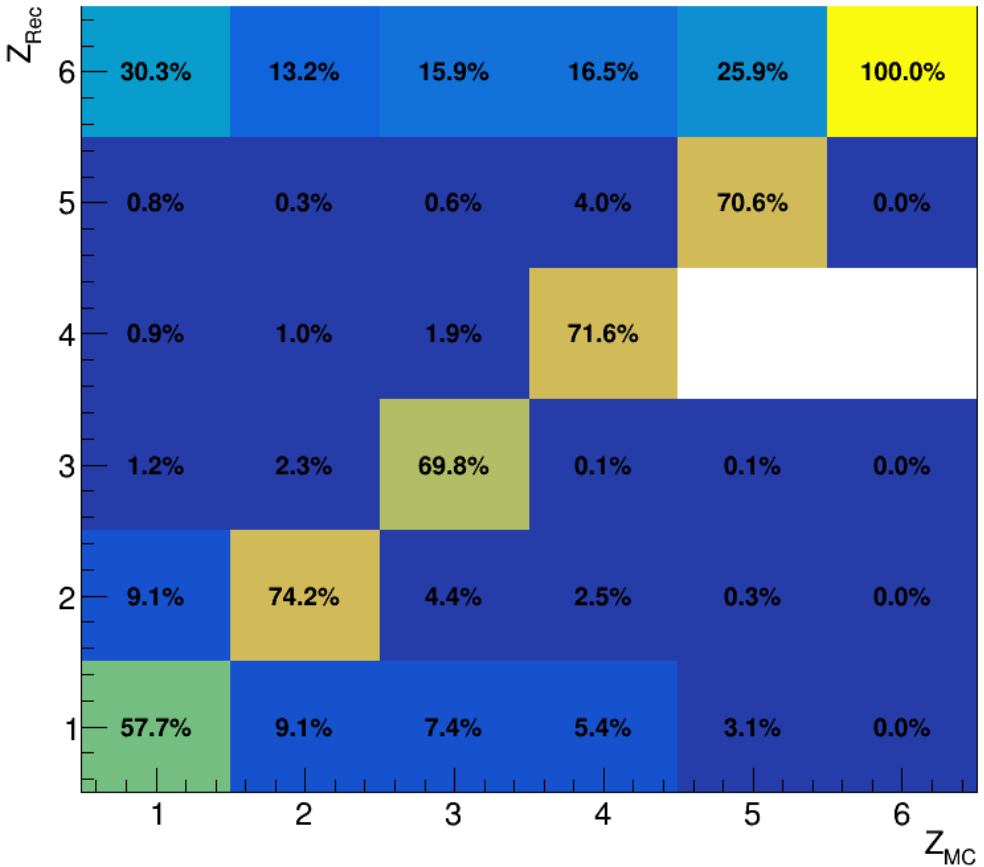
Here, I only selected events with no reconstructed C

→ in some crystals there is an excess of identified fragments

CMM matrices normalized by column - efficiency

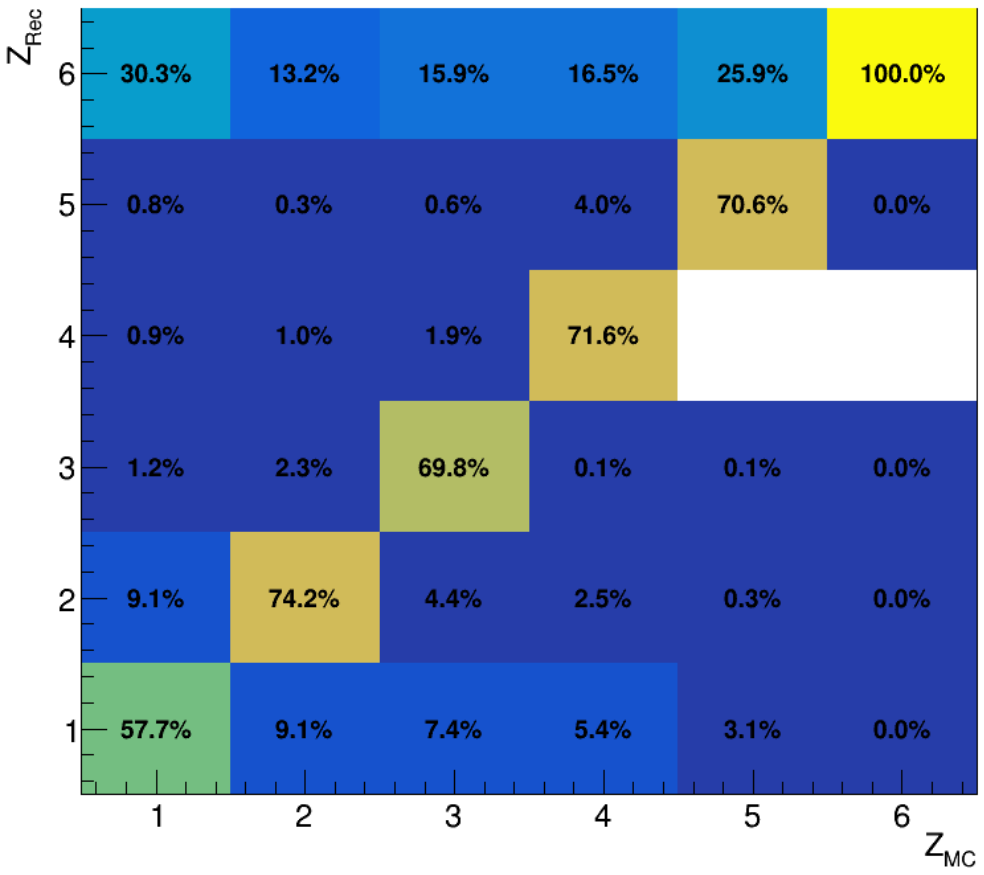


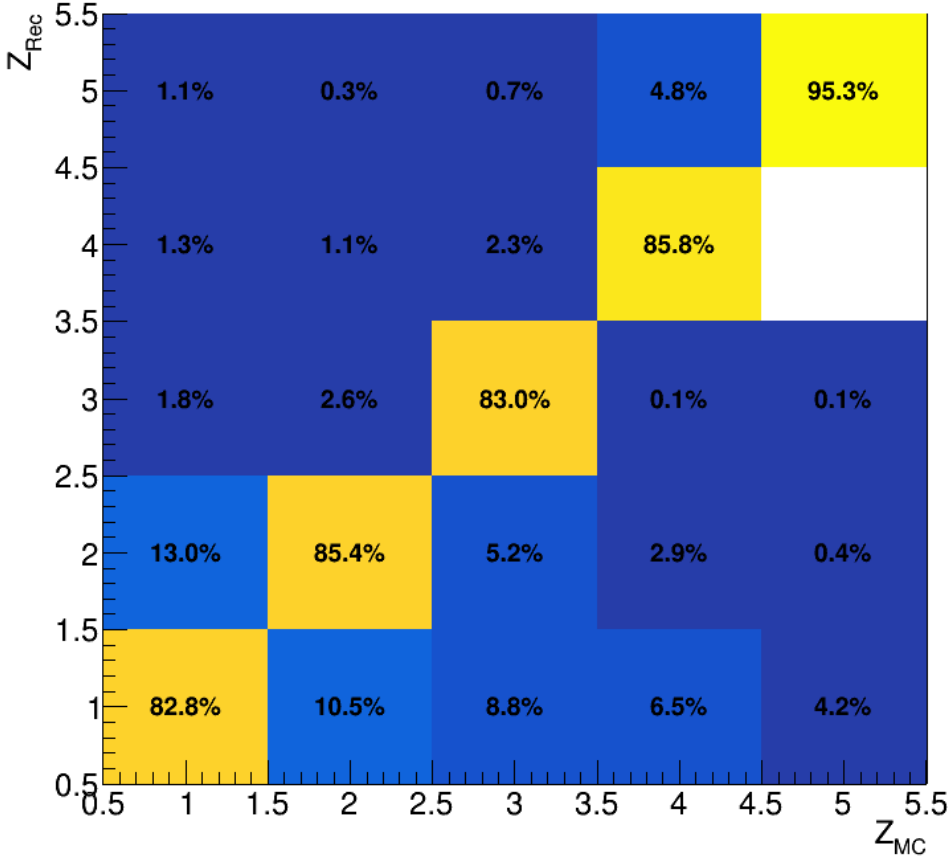
CMM matrices normalized by column - efficiency



After removal of events with at least one C...

CMM matrices normalized by column - efficiency





Conclusion and upcoming analysis

Fragments with low energy are produced in and out of target, in both cases impinging on the CALO
→ investigating on the origin of those fragments.

Z efficiency is improved when removing events with at least one reconstructed carbon
→ however, misidentification leads to more reconstructed than impinging fragments.

Background removal with at least 2 valid vertices is going to be tested.

E_{kin} binning is being refined to allow isotope separation and, in general, cross sections optimization.