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## Track extrapolation and muon identification with GEANT4E in Belle II event reconstruction

I describe the charged-track extrapolation and muon-identification modules in the Belle II data-analysis code framework (basf2). These modules use GEANT4E to extrapolate reconstructed charged tracks outward from the Belle II Central Drift Chamber into the outer particle-identification detectors, the electromagnetic calorimeter, and the K-long and muon detector (KLM). These modules propagate the position, momentum, 6-dimensional covariance matrix, and time of flight through the detailed Belle II detector geometry to permit comparison of the extrapolated track with the hits detected in the outer detectors. In the KLM, a Kalman filter is employed to adjust the extrapolation based on the matching measurements. Downward-moving cosmic rays in the upper half of the detector are back-propagated upward. Several modifications were made to permit GEANT4E to interoperate with GEANT4 within a single basf2 job for event generation+simulation+reconstruction and to expand the number of particle species that are extrapolated.

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