

The 3rd KMI School—Machine Learning in Particle and Astrophysics

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Breakout room #2: Bremsstrahlung recovery of electron at Belle II

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Content :

Belle II, the successor to the Belle experiment, has begun data collection since 2019 aiming to record 50 ab⁻¹ data at a peak luminosity of 8×10^{35} cm⁻²s⁻¹, which is 40 times higher than Belle. Charged leptons form an essential ingredient for many interesting physics channels at Belle II. In particular, an accurate reconstruction of the electron's energy is important as it radiates bremsstrahlung photons. This radiation is more prominent when the electron passes through a high-Z material. At Belle II, the energy of electrons is measured with the electromagnetic calorimeter (ECL). Before reaching the ECL electrons must pass through an inner tracking system, comprising silicon pixel and strip vertex detector, which leads the former to radiate. Due to the bremsstrahlung radiation the measured energy of electrons is changed with respect to when they are produced via some process. To mitigate this situation, the bremsstrahlung photons are searched for around the electron's track direction and four momenta of such photons are added with the electron to recover its momentum. In this poster we describe the Bremsstrahlung recovery framework and its performance with the current dataset of Belle II.

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