

Particle identification with cluster counting technique for the drift chamber at CEPC

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A good identification of charged kaons is essential for the flavor physics and benefits the determination of jet flavor and jet charge at CEPC for Z-pole operation. To achieve these physics goals, a design of tracking system combining a silicon tracker and a drift chamber is proposed. The drift chamber could provide dN/dx measurements with cluster counting technique, as well as those of dE/dx . A simulation study on the cluster counting technique has been performed with the Garfield++ program, the primary ionization, avalanche processes, and peak finding on the induction signals have been carefully investigated. The result shows that the resolution and separation power with cluster counting technique are significantly better than those of the traditional dE/dx method. The effects of the gas mixture, sampling frequency, signal spreading, and the noises are also taken into account. A prototype system is being prepared to study the feasibility of cluster counting technique.

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