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## PFA reconstruction for the transverse crystal bar ECAL in the future lepton colliders

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Future electron-positron colliders require precise energy resolution of jets to measure the Standard Model particles and explore new physics. A novel electromagnetic calorimeter (ECAL) with transverse crystal bars has been proposed for the future electron-positron collider experiments, offering high intrinsic energy resolution, 3D granularity required by the Particle Flow Approach (PFA) and  $O(10)$  fewer readout channels. The main challenges of this new design are the ambiguity problem for multiple simultaneously injected particles from the perpendicular arrangement of crystal bars and the overlap between showers from larger Moliere radius of the crystal.

In this report we will present a new PFA with several sub-algorithms to address above issues, and prove the feasibility of this ECAL design. The ambiguity problem is solved by multiple optimized pattern recognition approaches, and the overlapping showers are addressed by an energy splitting module. The global performance is preliminary investigated within the Circular Electron Positron Collider (CEPC) environment. The results indicate that the proposed ECAL design, combined with the self-designed PFA approach, offers a promising solution for future collider experiments. It improves the energy resolution and is compatible with the PFA idea. This can be a new option to the future collider experiment technology.

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