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Simulation progress of the GSHCAL for the CEPC

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The precise measurement of the mass and properties of the Higgs and W/Z bosons is the key scientific goal for the future e+e- Higgs factory. A big challenge for this goal is to fulfill an unprecedented jet energy resolution, and the scheme selection of the hadronic calorimeter (HCAL) is one of the most important factors. Due to the low cost, the HCAL based on the plastic scintillator (AHCAL) and gas (DHCAL) have been adopted for the CEPC baseline design and a Boson Mass Resolution (BMR) ˜3.8% was achieved, which still leaves room for improvement. The low density of sensitive material in the baseline design leads to the low energy sampling fraction, limiting the improvement of energy resolution. Though the crystal possesses the advantage of high density and can significantly improve energy resolution, its fancy price reduces dramatically the cost performance and becomes the main problem for its application in HCAL. Given the deficiency of the crystal and the plastic scintillator, a new concept, Glass Scintillator Hadronic Calorimeter (GSHCAL), was proposed to replace the baseline HCAL design. The glass scintillator balances the advantages of the crystal and the plastic scintillator at same time, i.e., high density and low price, which provides a highly cost-effective design option to improve significantly the jet energy resolution. Based on current simulation, a BMR around 3.4% can be achieved by using the GSHCAL, which shows ˜10% improvement with respect to the baseline design. In this contribution, the simulation progress of intrinsic performance and particle flow algorithm (PFA) performance of the GSHCAL will be introduced.

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