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A New Jet Pairing Method for Reconstructing $HH \rightarrow b\bar{b}b\bar{b}$ Events

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In the ATLAS $HH \rightarrow b\bar{b}b\bar{b}$ analysis, jets are paired to form Higgs boson candidates by minimizing the perpendicular distance between the pair and the line joining the point (120 GeV, 110 GeV) to the origin in the plane of leading Higgs boson candidate mass – subleading Higgs boson candidate mass. This strategy is shown to reconstruct background events such that they peak around the point (120 GeV, 110 GeV) where a signal would be expected. Here an evaluation of an alternative strategy is presented.

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