The LHCo Challenge 2020

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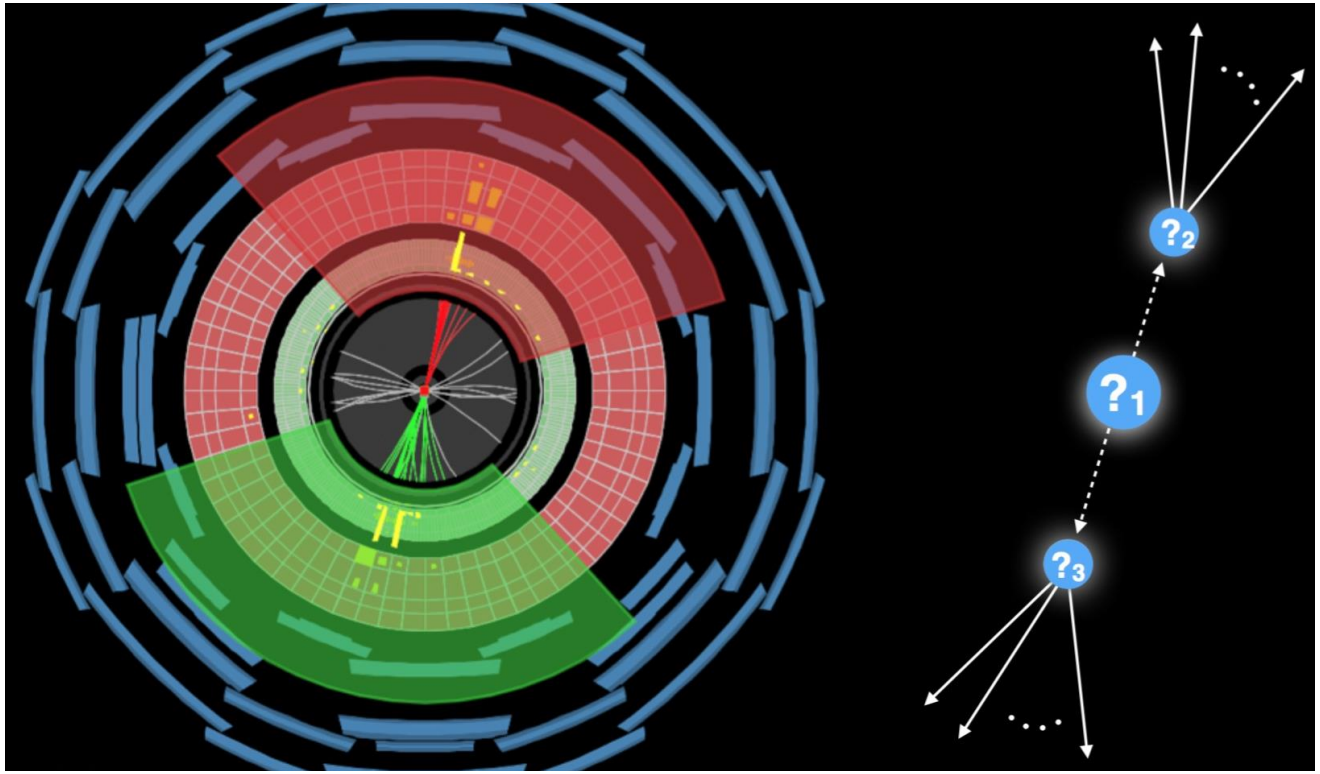
Objectives



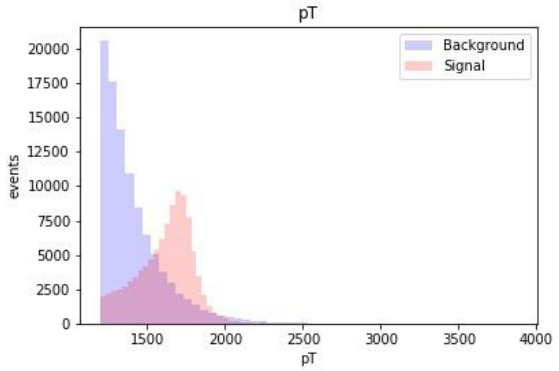
- Optimize the signal amount over background.
  - Checking efficiency

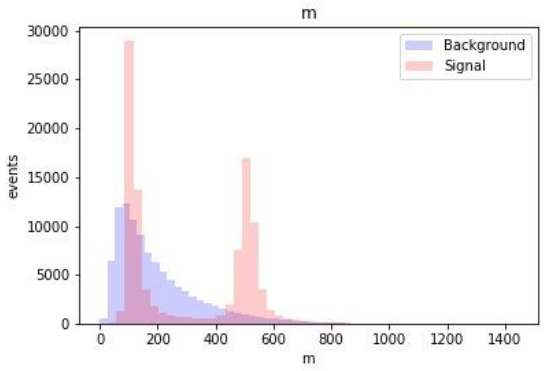
Black Boxes

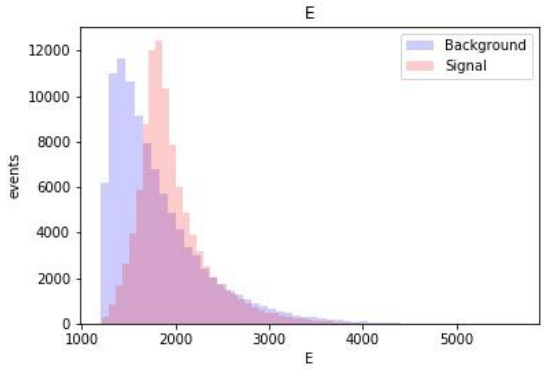
- Each BB have a million events.
- A jet with R=1, $|\eta| < 2.5$, and $p_T > 1.2\,TeV$.
- Info included: p_T, η, ϕ
- Black Boxes represent real data, which means they are mostly background and may contain signal.

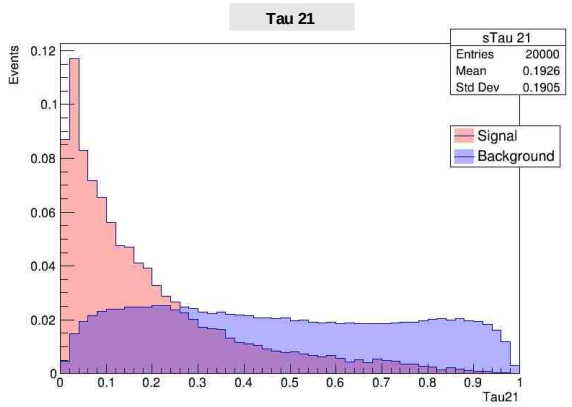
Classification

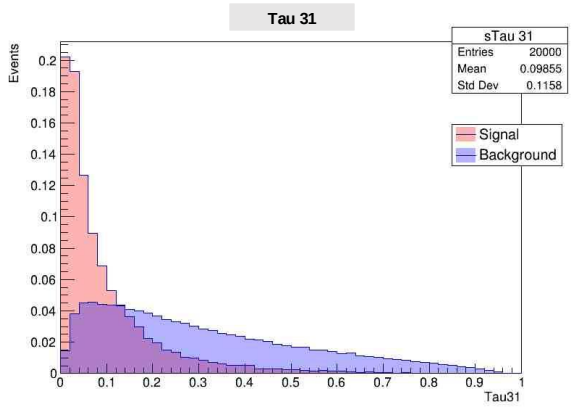
- Identify the variables that further separate the signal from the background in the sample data.
  - Transverse moment, mass, Energy and ratio Tau.

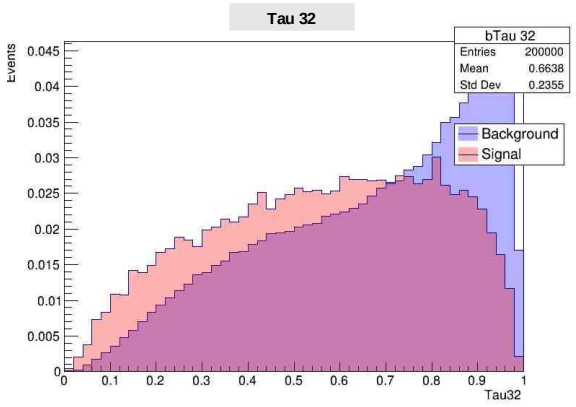






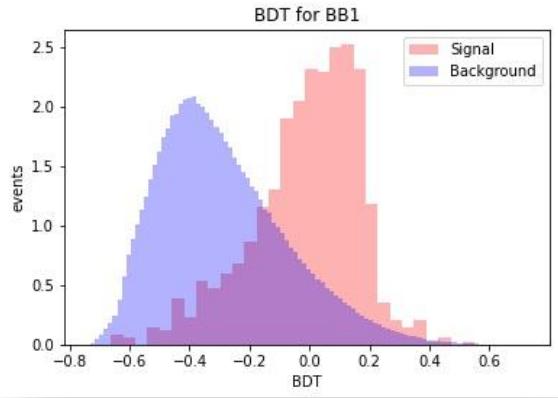


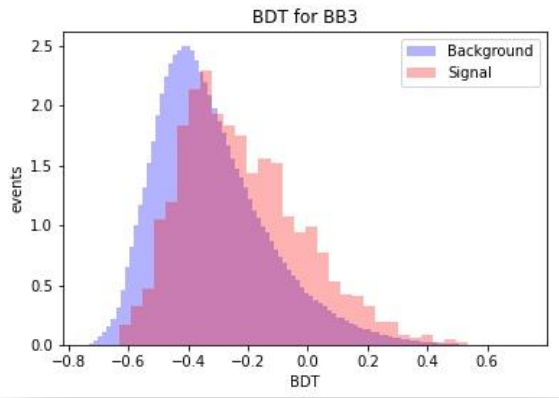


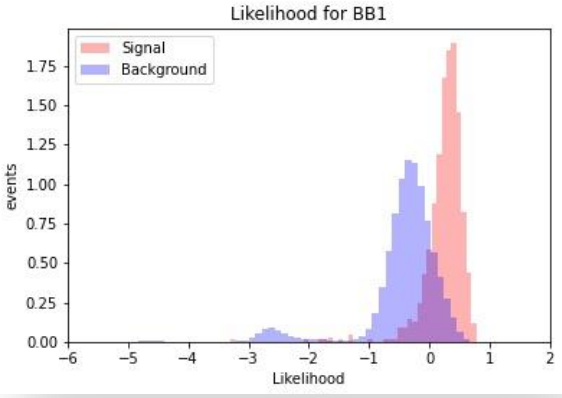


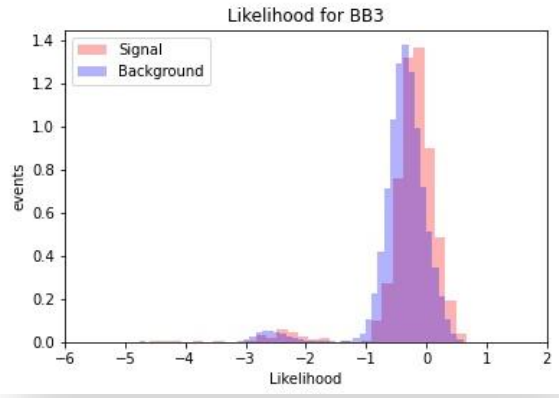
Classification Application

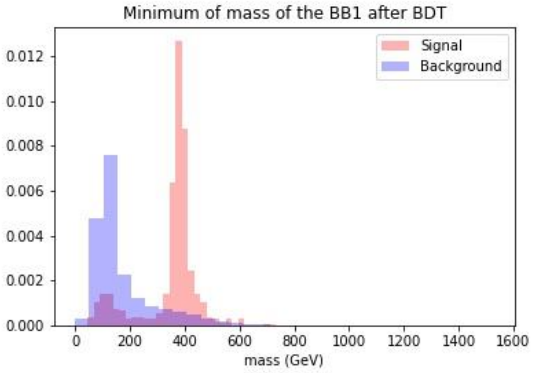
- Apply the event classification to each black box to identify which events remain.
- BB2 is just Background
- Use master keys to separate signal from background for each BB.
  - BB1 have the same topology as sample data
  - BB3 have different topology of sample data

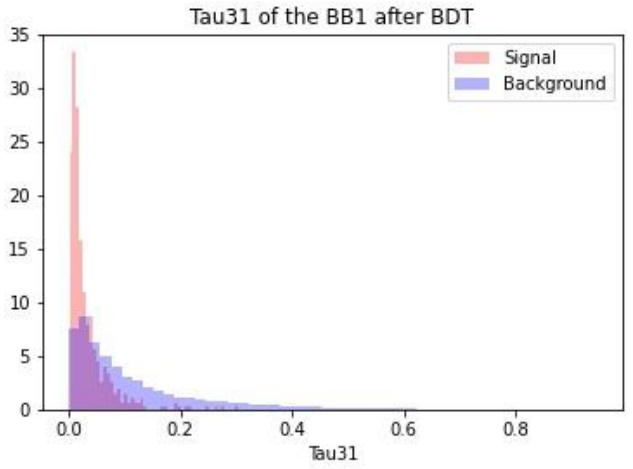


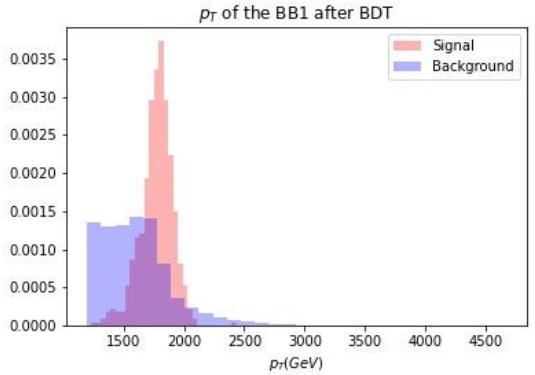


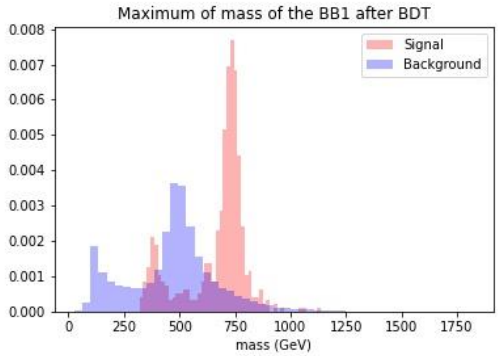


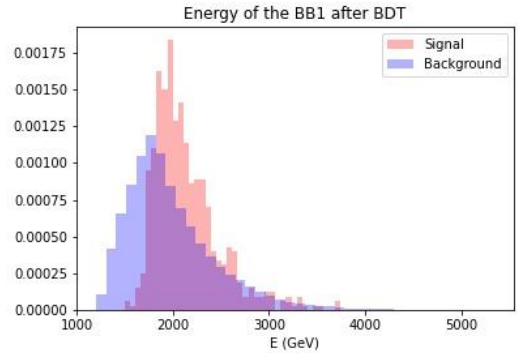


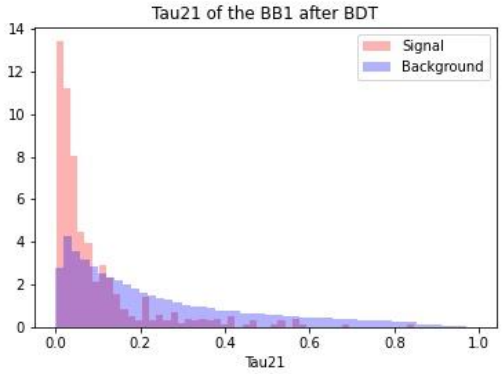

Minimum of mass of the BB1 after BDT
Signal
Background
mass (GeV)


Tau31 of the BB1 after BDT
Signal
Background
Tau31


p_T of the BB1 after BDT
Signal
Background
p_T(GeV)


Maximum of mass of the BB1 after BDT
Signal
Background
mass (GeV)


Energy of the BB1 after BDT
Signal
Background
E (GeV)


Tau21 of the BB1 after BDT
Signal
Background
Tau21

Results

Thanks!