TeV scale gravity

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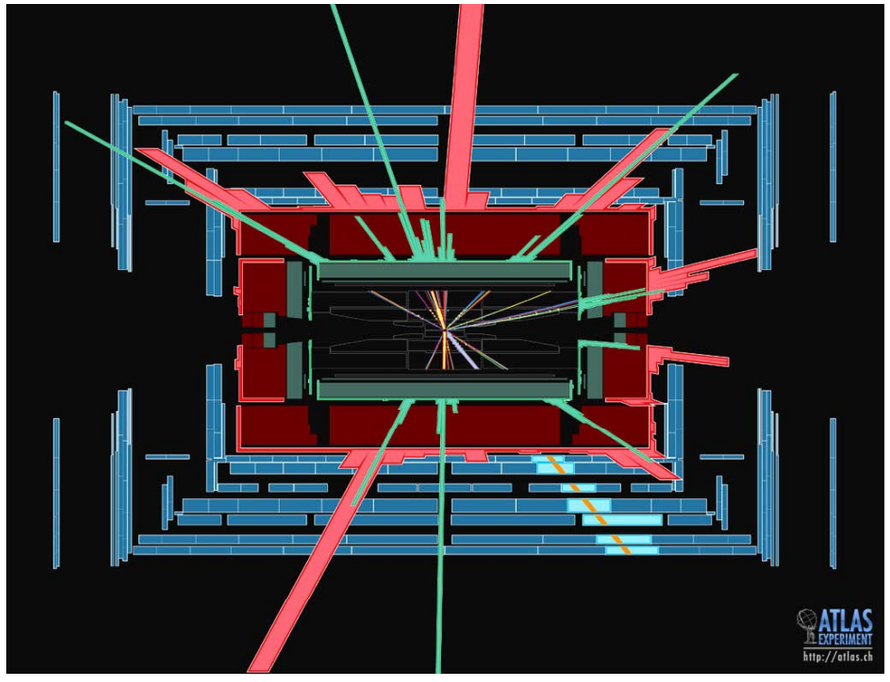
BND 2009



high invariant mass object search with Atlas

high invariant mass object search with Atlas

extra dimensions search at the TeV scale with Atlas detector

high invariant mass object search with Atlas

extra dimensions search at the TeV scale with Atlas detector

direct search of large extra dimensions with the Atlas detector

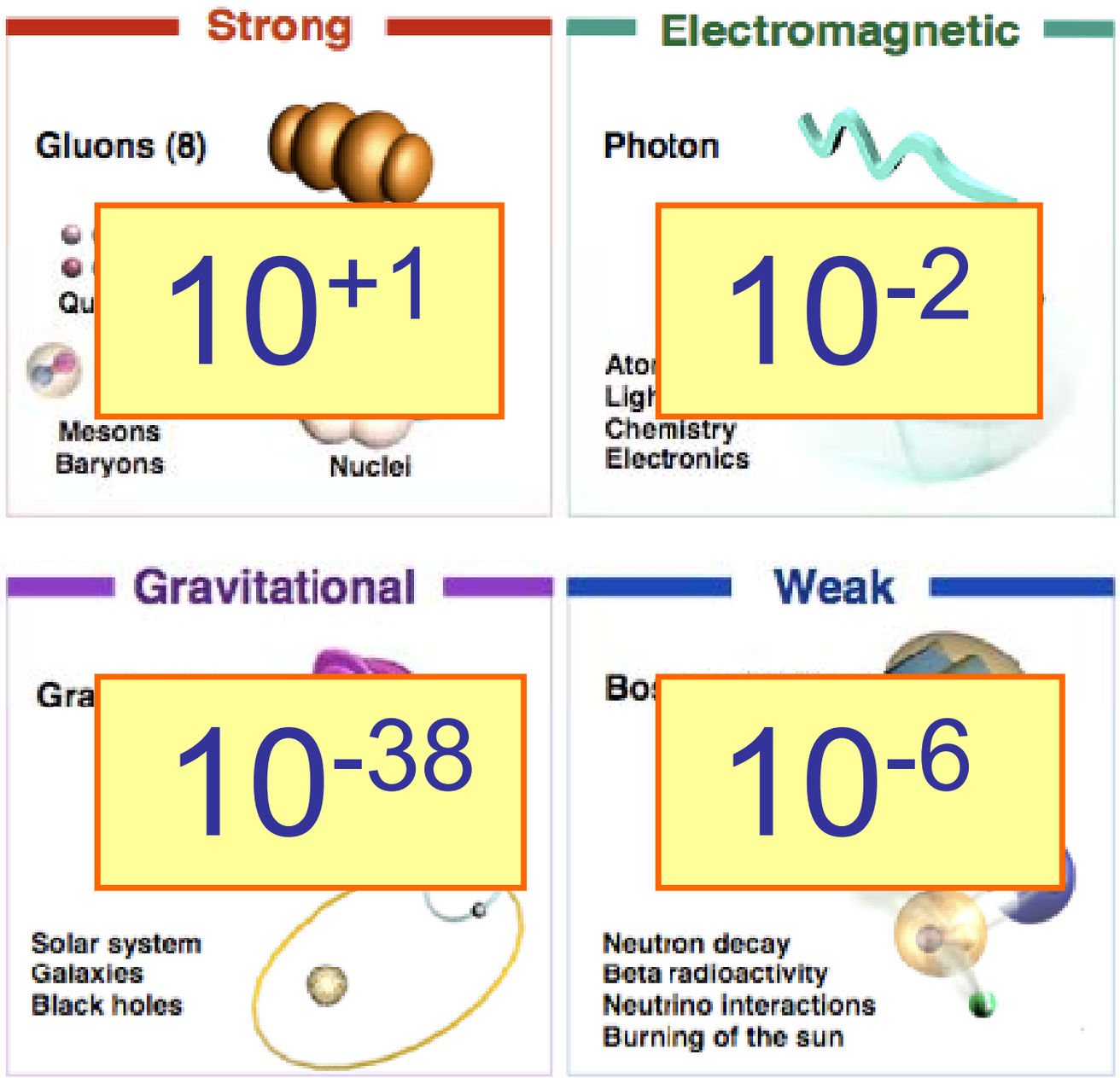
high invariant mass object search with Atlas

extra dimensions search at the TeV scale with Atlas detector

direct search of large extra dimensions with the Atlas detector

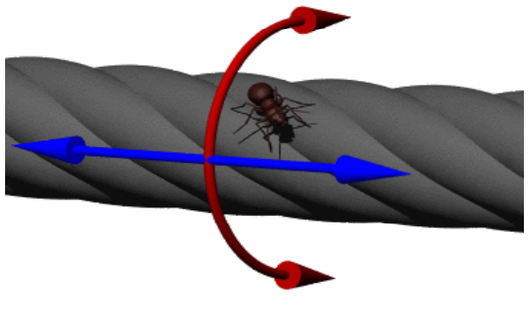
direct search of large extra dimensions with A Thoroidal Lhc AparatuS detector at the Large Hadron Collider

why all these theories?



extra dimensions

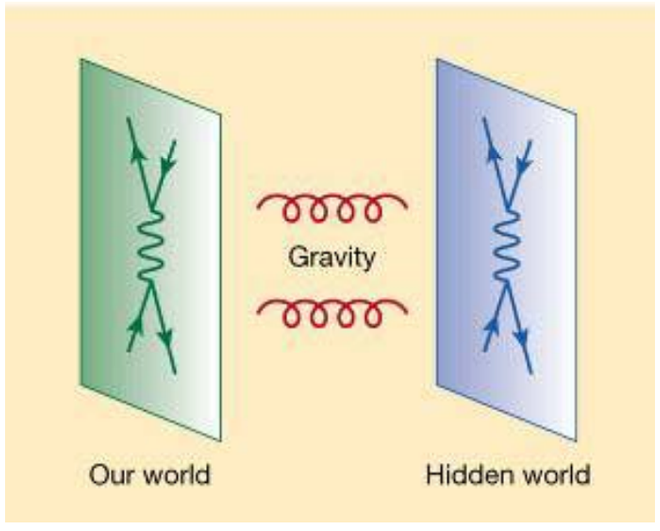
- In 1920's Kaluza&Klein attempted to unify EM with gravity in 5D
- In late 1990's, models built to solve the hierarchy problem
- We observe apparent gravity; actual gravity is stronger and its scale can be as low as ~ TeV
- Many ED models: flat (ADD, TeV^{-1}), warped (RS); various particles escaping into "bulk" while SM is confined to our 3-brane



$$G_N = \frac{1}{(M_{PL(4+n)})^2} \equiv 1/M_D^2$$

$$M_{Pl}^2 = M_D^{2+n} R^n$$

$M_{Pl} \sim 10^{19}$ GeV, $M_{Pl(4+n)} \sim M_{EW}$



$1/r^2$-law valid for R=44 μm @ 95% CL

boom, Atlas, booooom

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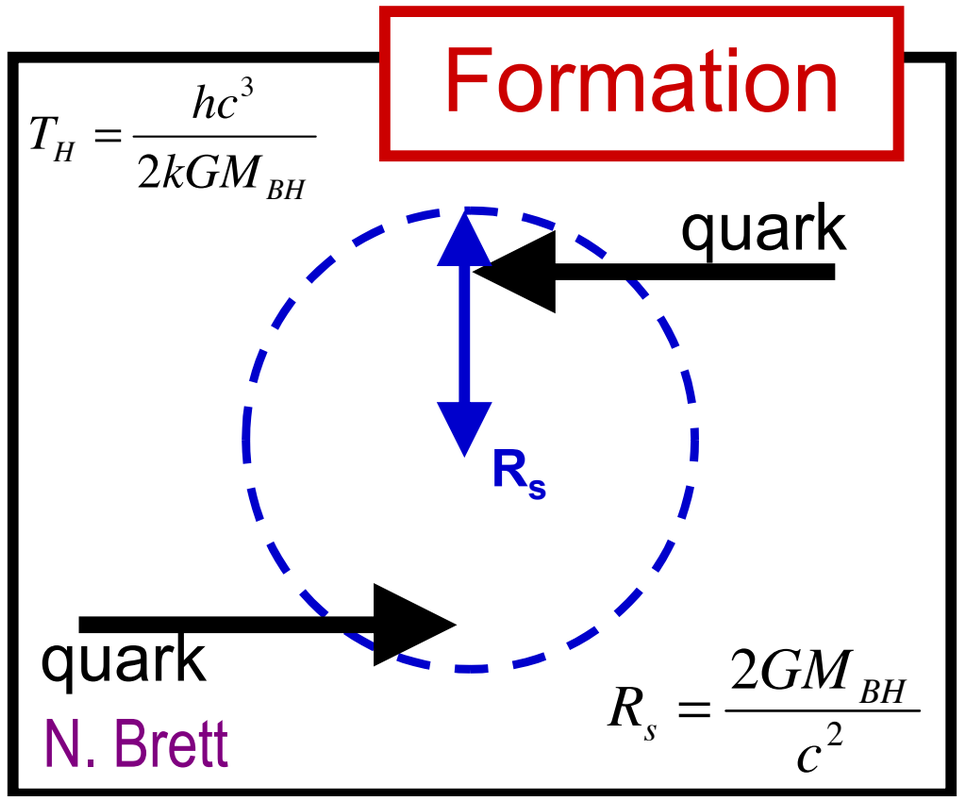
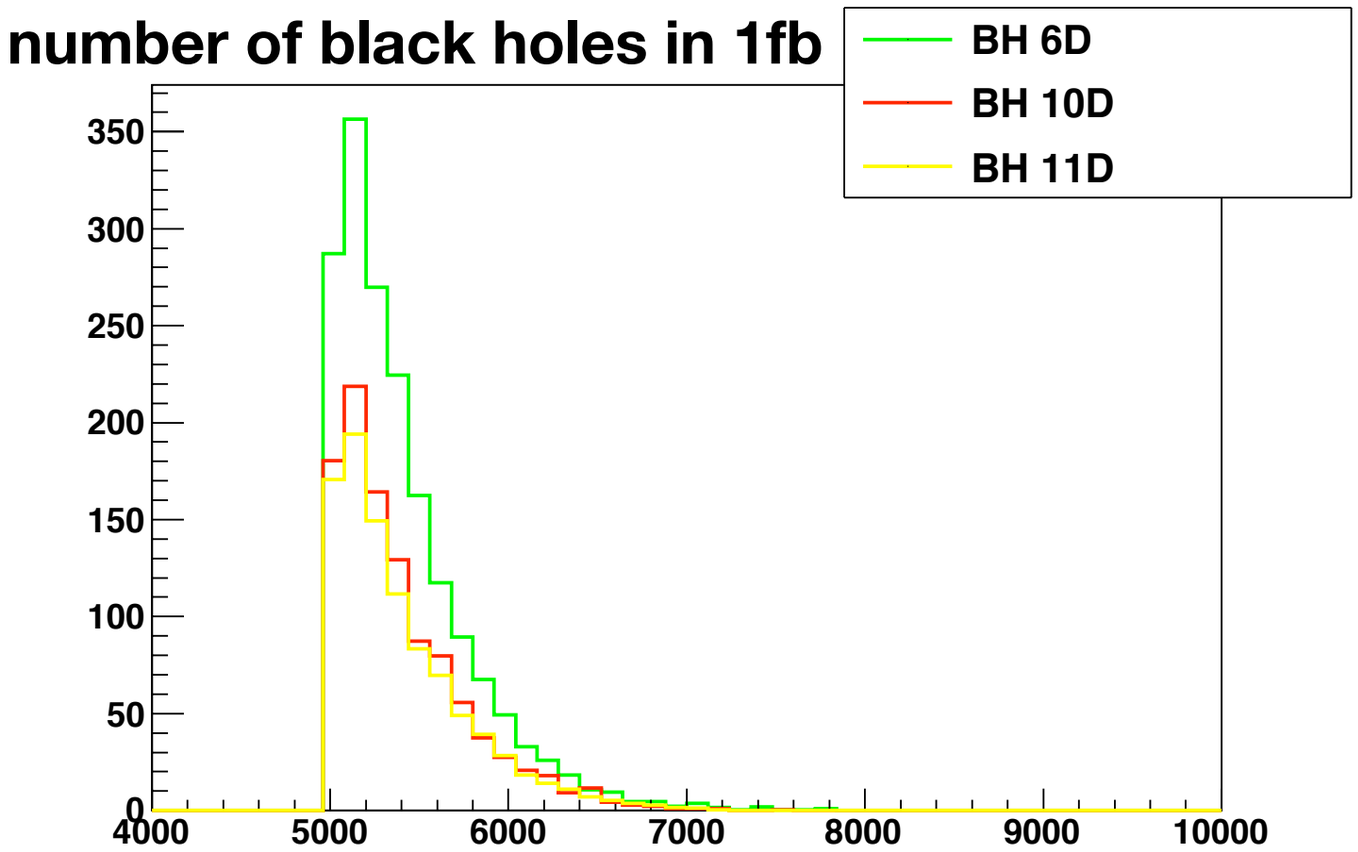
black hole formation and decay





programming language inventor or serial killer?

programming language inventor or serial killer?

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Bertrand Meyer

initial designer of Eiffel language

0 known kills

programming language inventor or serial killer?

programming language inventor or serial killer?

Anatoly Onoprienko

“the terminator” wiped out entire families across Ukraine with a 12 mm

54 confessed kills

programming language inventor or serial killer?

programming language inventor or serial killer?

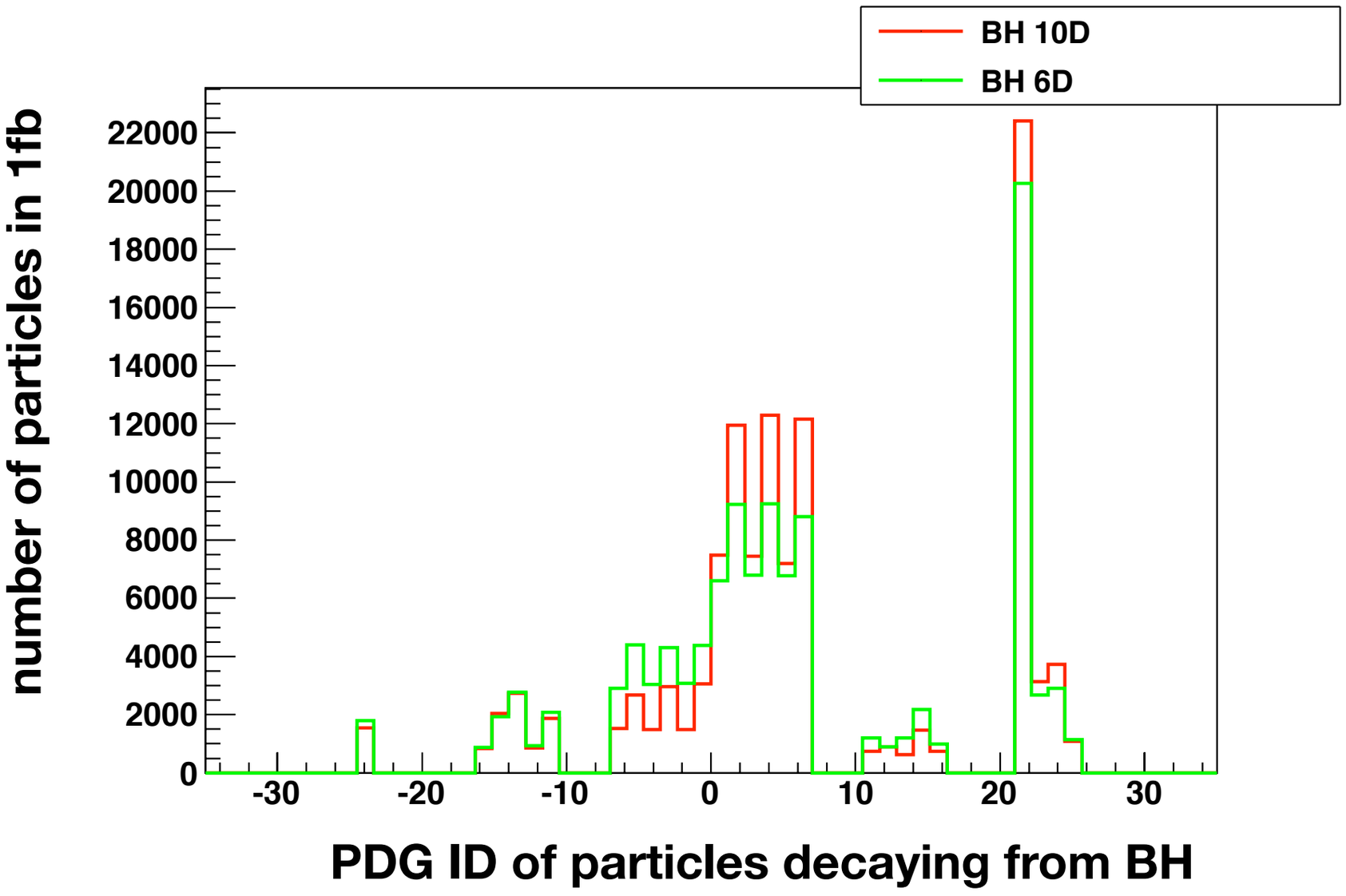
Torbjorn Sjostrand

(one of) Pythia creator(s)

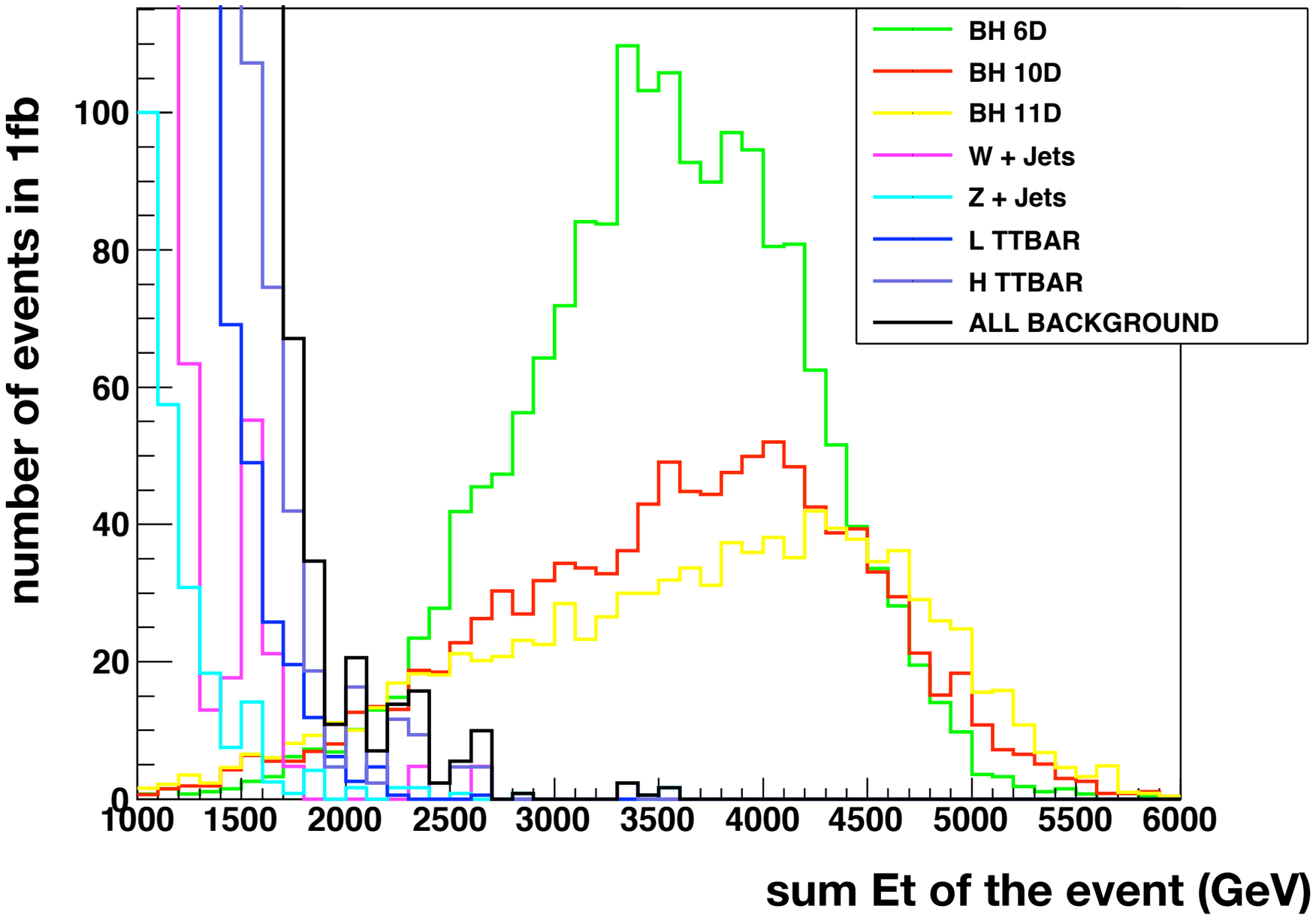
lecturer BND 2008 on MC generators

0 known kills

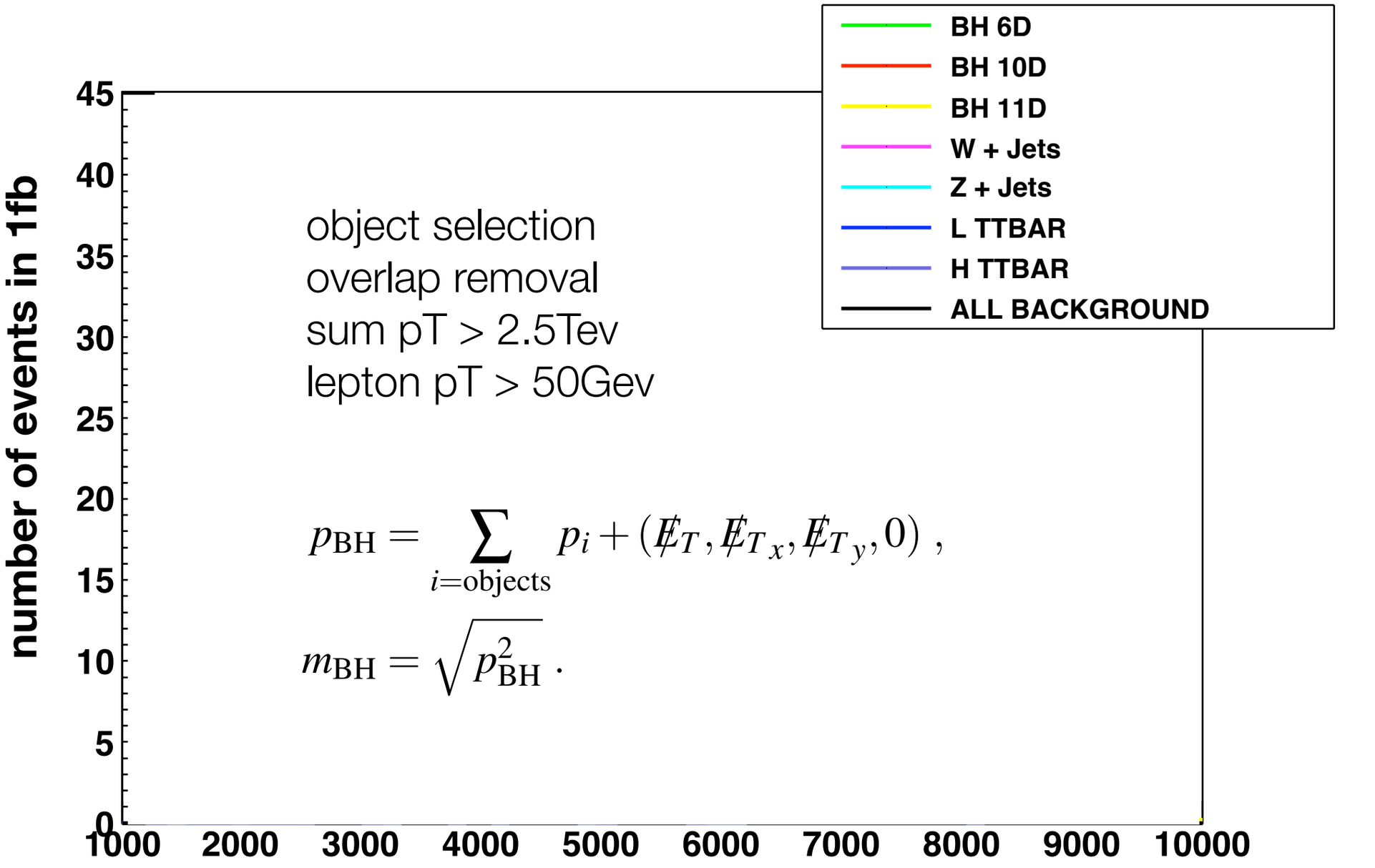
decay and analysis strategy



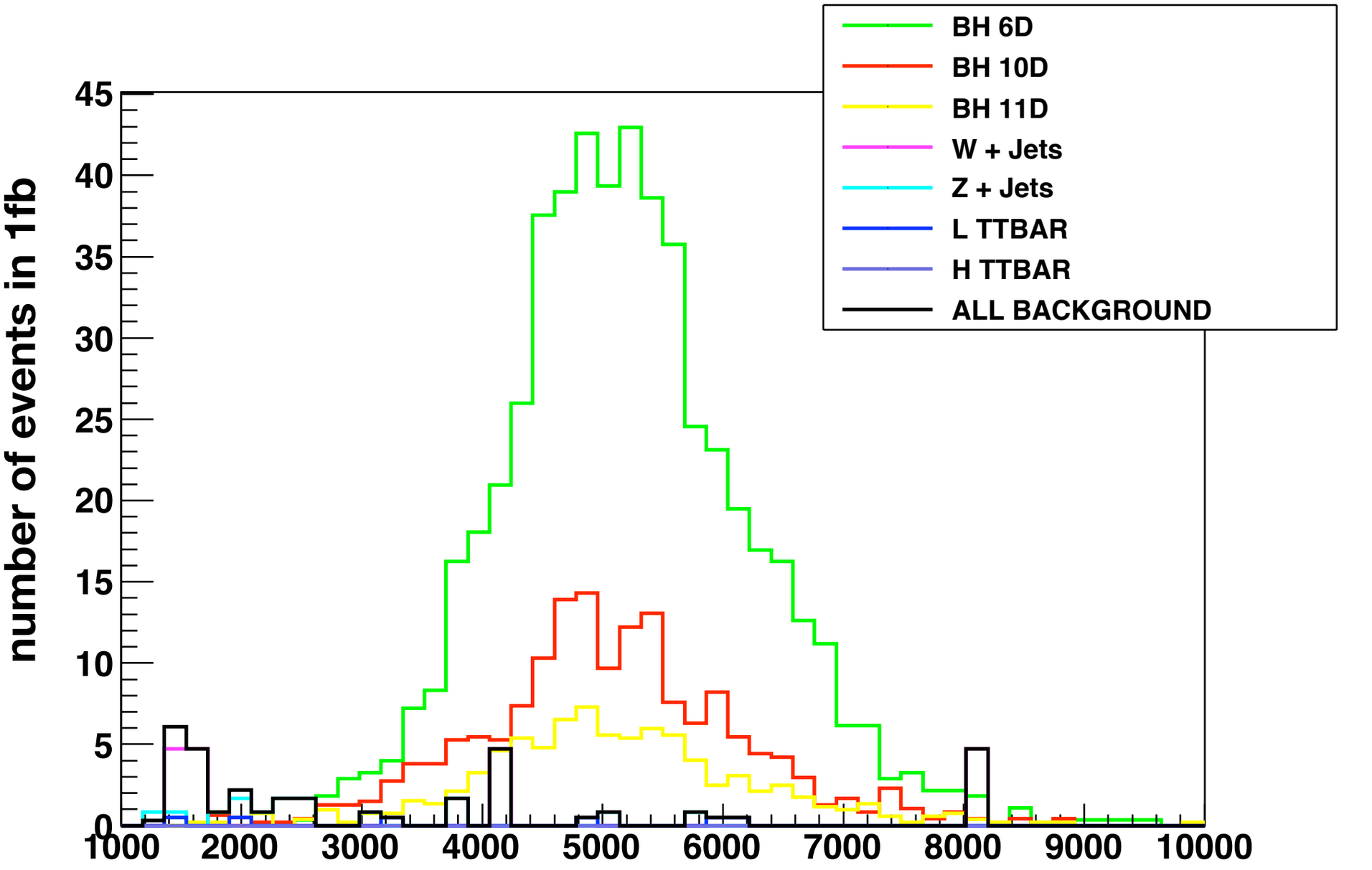
(true) black hole event properties



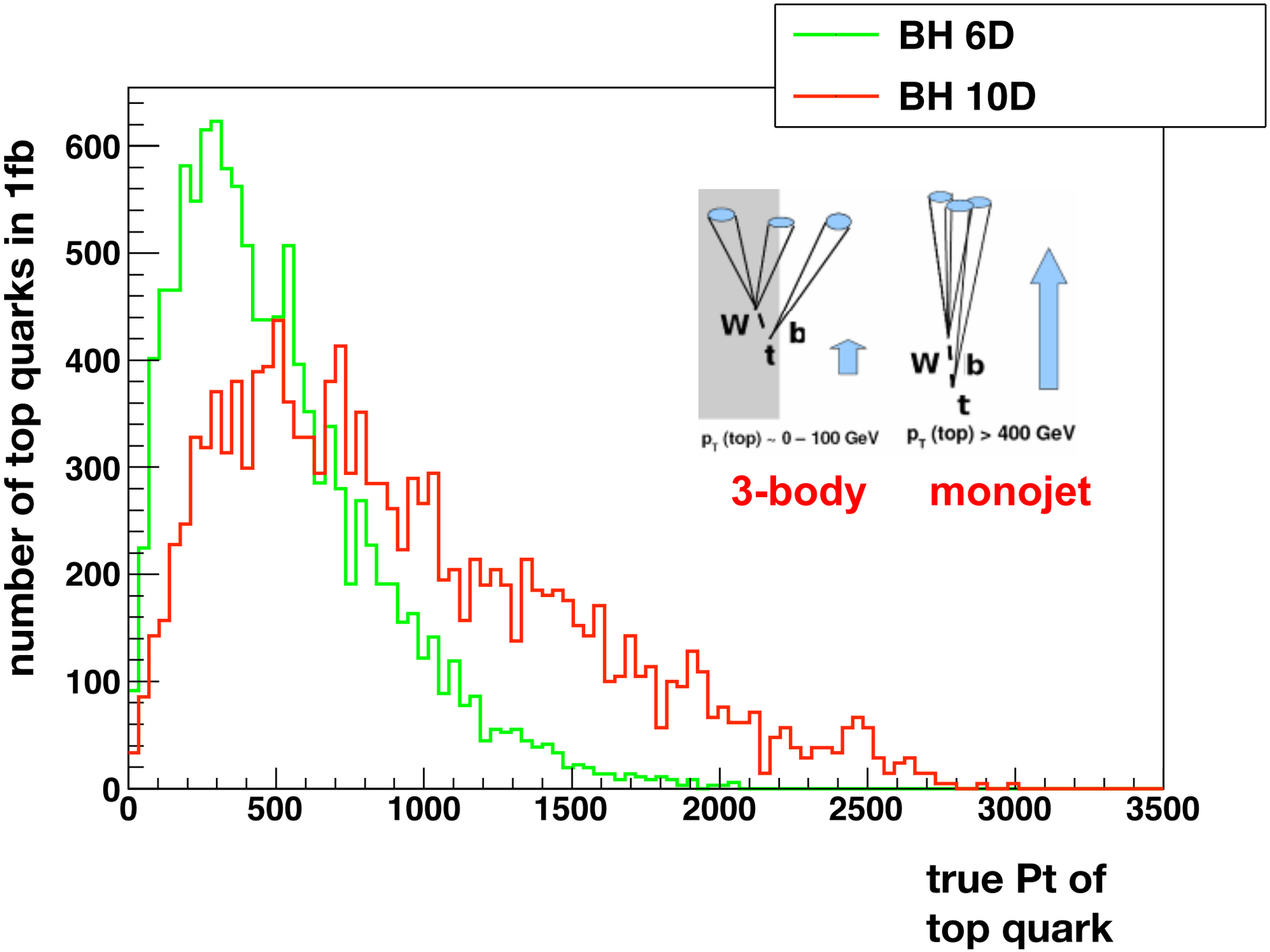
the Atlas TDR analysis



the Atlas TDR analysis



links to ttbar



the trigger problem

- processing time per event is constrained by luminosity / DAQ throughput requirements
- black holes are fat events: therefore slow and big (memory limits)
- will they timeout and go to the **debug stream** on first data taking?

trigger offline system