H → invisible

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Benchmarks: overview

- $e^+e^- \rightarrow ZH$, $Z \rightarrow$ jets, $H \rightarrow$ invisible at 500 GeV
- Important part of the physics case at 250 GeV

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- Depends on: jet energy resolution (+ISR, LS, ...)

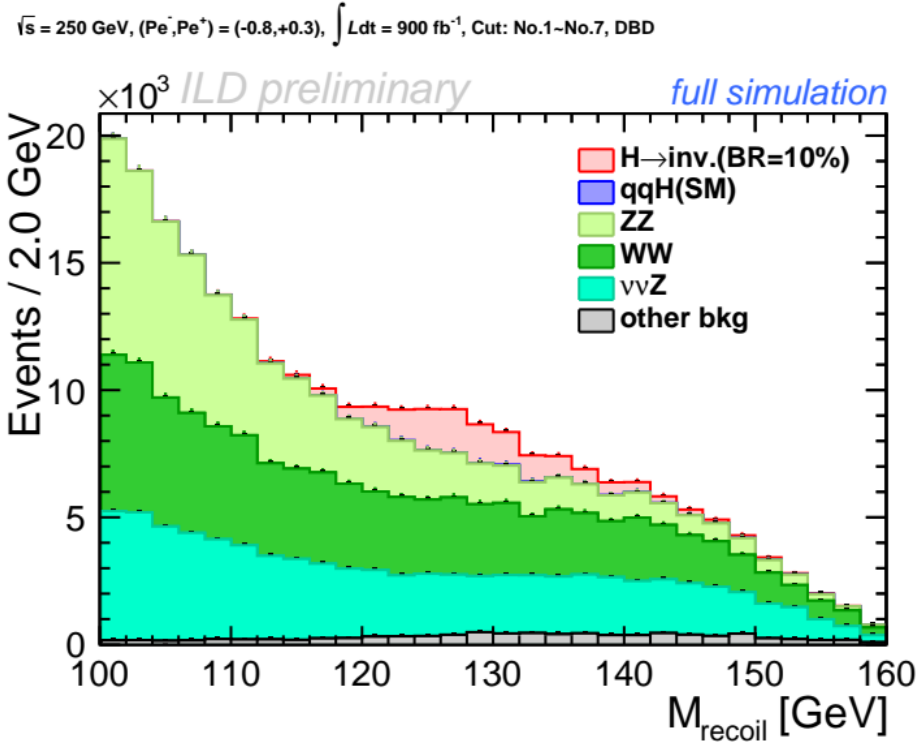
Documents and publications

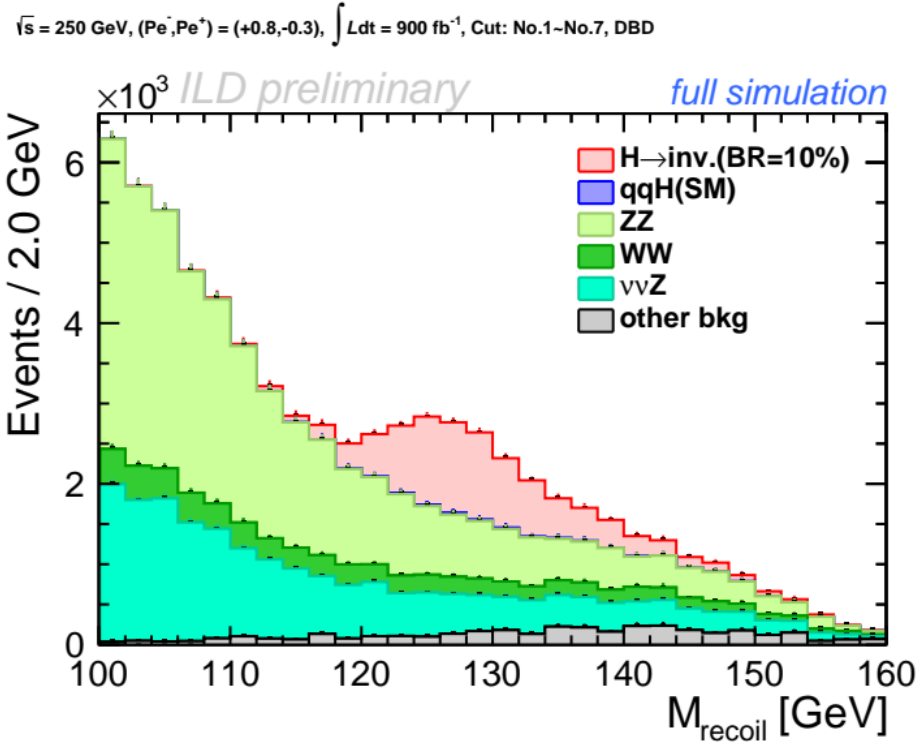
- Nothing published yet...

  ...even if H→ inv. result at 250 GeV is obviously very important
- Regular communication between referee and analysis team

  → analysis team working very well and responding very quickly
- Yu prepared a draft note in Overleaf last week, with section titles and figures with 500 GeV results
- https://www.overleaf.com/read/wckvhzcdqsrj

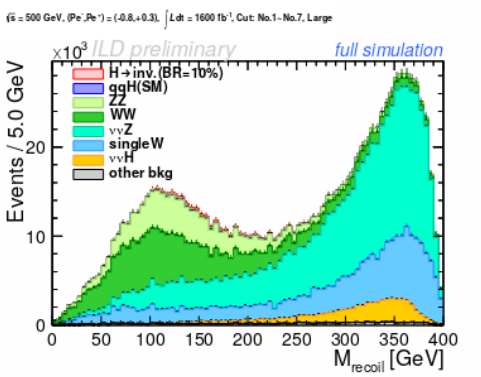
Physics message





Gorgeous result at 250 GeV

Physics message



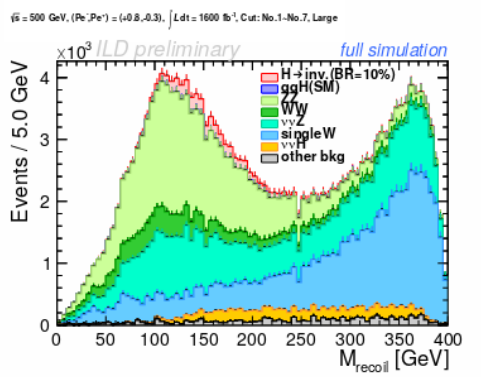
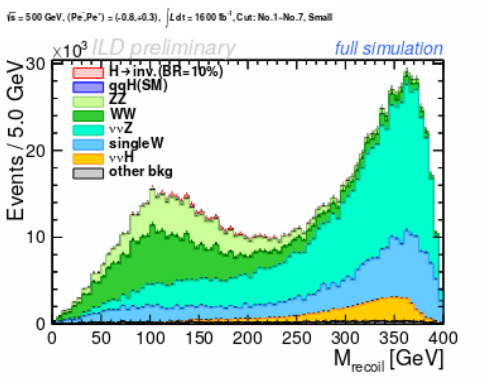
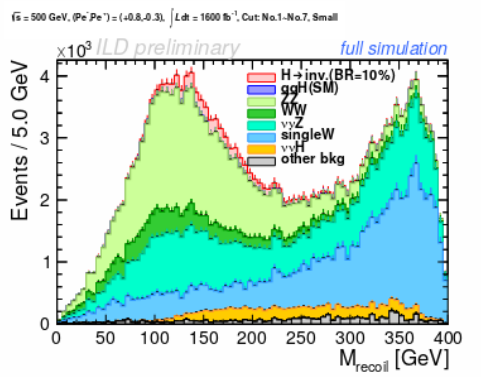


Figure 5: Full simulation result of recoil mass after event selection with Large detector

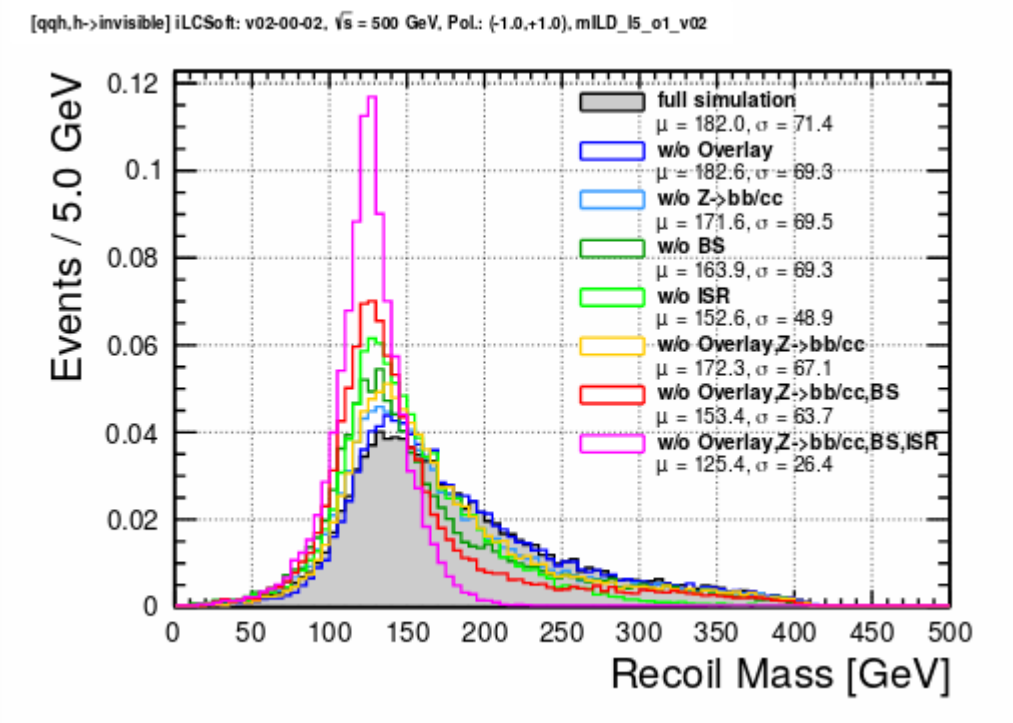




Much harder at 500 GeV
Indeed, limit on BR(H→inv.) 3 times worse

Analysis status

- Very detailed study of sources of degradation at 500 GeV has been performed



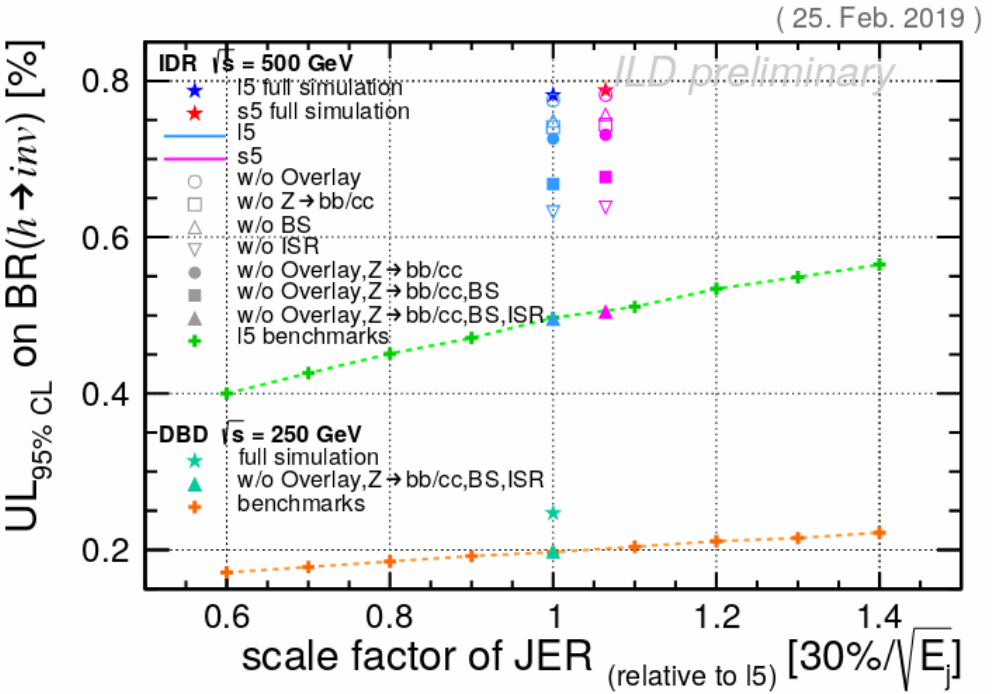
Rather large amount of cheating needed to become sensitive to detector design

- overlay may be tackled with a combination of removal and robust jet algorithms
- impact of neutrinos in heavy flavour decays may be tagged or corrected
- ISR harder to tackle (forward calorimetry)
- Luminosity spectrum impossible?

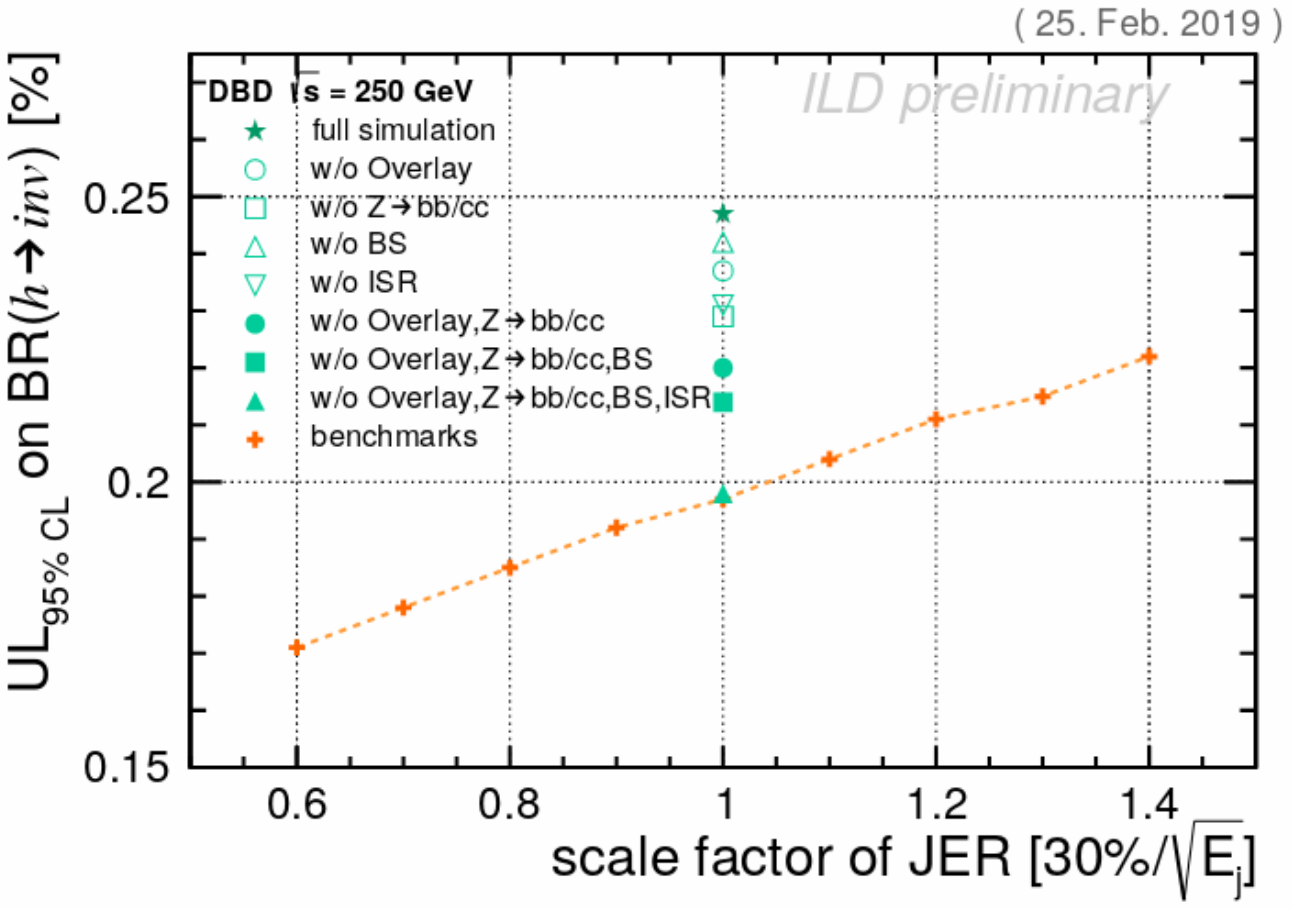
Analysis status

- As you have seen in the presentation, solid and interesting results exist
- Clear dependence on JER after a lot of cheating
- Note that 250 GeV raw result is much closer to cheated result

My favourite candidate plot for IDR
- include 250 GeV result?
- declutter by reducing number of cheating scenarios?

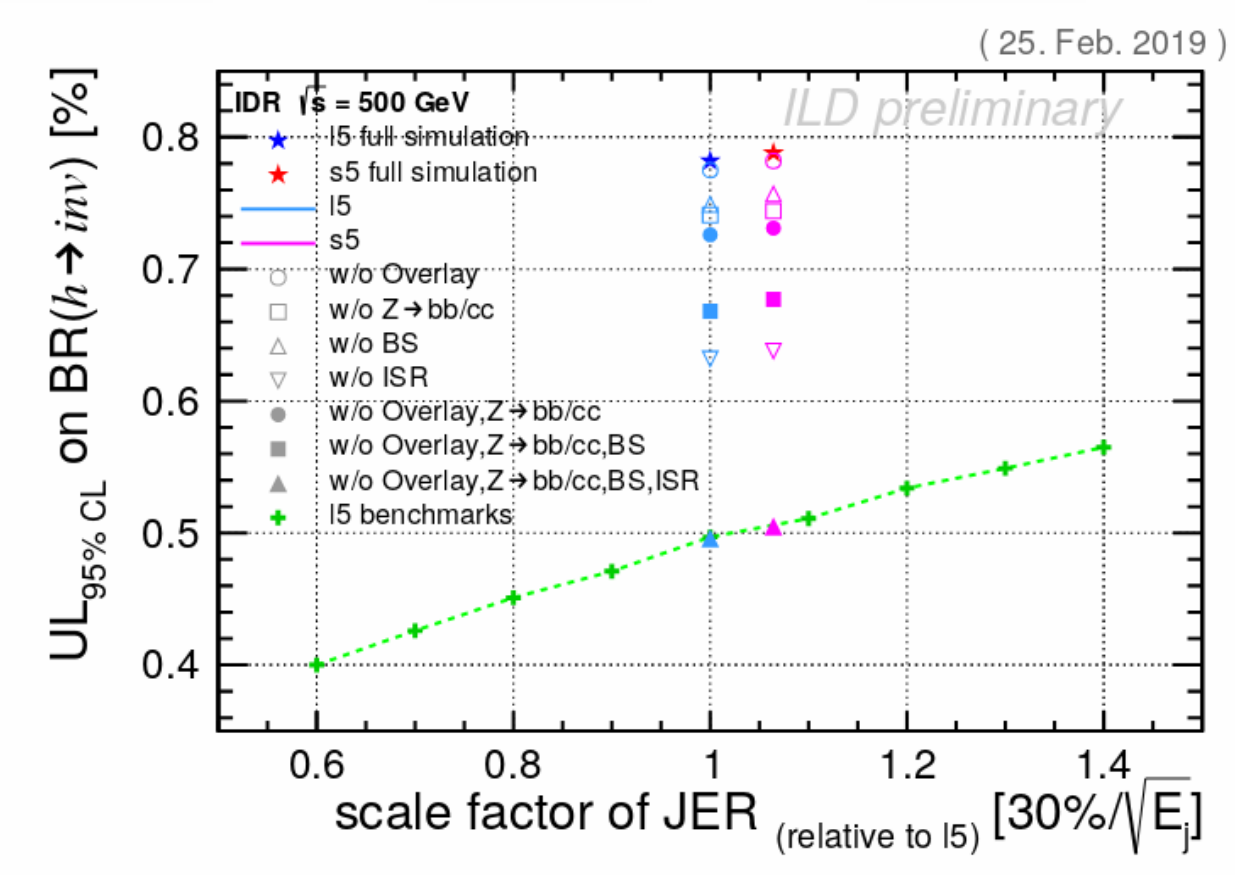


Benchmark results



At 250 GeV:
0.2% (ideal) → 0.24 (full)

Benchmark results



At 500 GeV:
L5: 0.49 (ideal) → 0.77 (full)
S5: 0.51 (ideal) → 0.79 (full)

Finalizing results

- About the contribution to the IDR
  - The jet energy resolution affects the result, but effect is marginal
  - We understand why the effect of the JER on 500 GeV analysis is less pronounced than naively expected
  - Breakdown of effects useful to define optimistic S2 scenario?

- Document the method in detail in its own publication
  - Detailed, high-profile publication about 250 GeV results
  - Draft exists for IDR backup note, time line compatible with IDR!