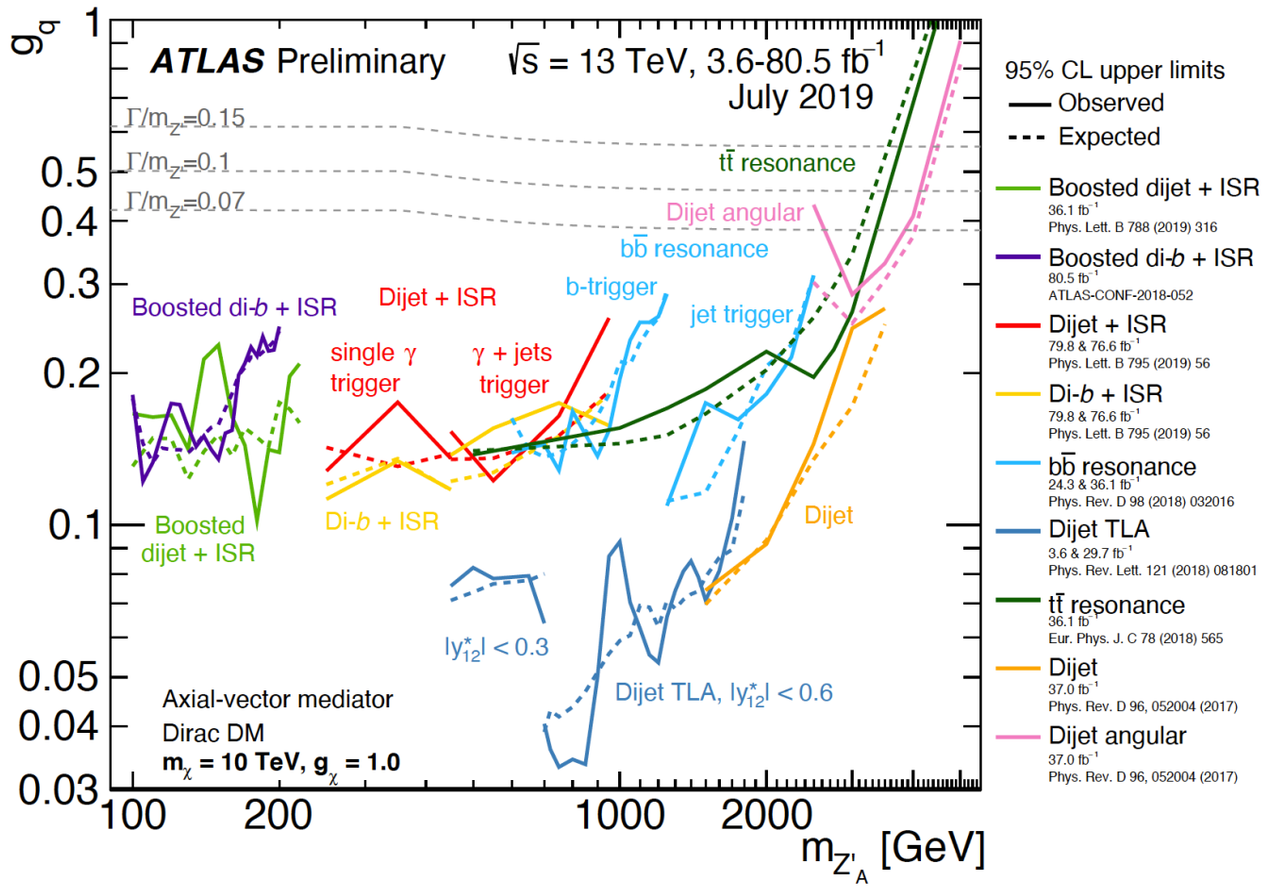
Light resonances at LHC

- Pseudoscalar mediators allow one to generate the observed DM relic density thermally while evading constraints from direct detection experiments.
  - g_q to the SM fermions Yukawa-like → mediators would decay mostly to bb
- Main experimental challenge which limits extending searches at low masses (<100 GeV) is the large background rate
  - The challenge at trigger level stringent requirements on hadronic jets are usually needed in order to cope with the bandwidth limitations
- New for Run 3 at trigger level:
  - ATLAS Phase-I upgrade → correlation between jets and muons, from b-quark decay, observables at LVL1
  - Extensive use of full scan tracking at High Level Trigger → better pile-up reduction
- Cutting-edge data acquisition strategies to overcome the HLT CPU limitations in events where intensive b-tagging algorithms are used
  - Trigger Level Analysis → reduce the energy threshold at LVL1 by recording only HLT objects, avoiding the full reconstruction step, with a consequent reduction of the event size to O(1%) of the standard size.
  - Partial Event Building → readout and record only part of the detector, preventing the saturation of the available bandwidth

ATLAS Dark matter summary plots



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