Analysis Overview

Analysis:
- Search for electroweak production of $VV + 2j$
- Use semileptonic channels ($\ell\ell qq$, $\ell\nu qq$, $\nu\nu qq$)
  - Exploits larger branching fraction $\rightarrow$ more statistics in tails
  - Showed best sensitivity to aQGC in Run-1
- HL-LHC study with $300\,fb^{-1}$ and $3000\,fb^{-1}$
- HE-LHC at 27TeV

Projections on:
- Cross-section precision on EWK VBS
- Limits on aQGC
- 3 orthogonal channels based on number of tight leptons
  - For HL-LHC may focus on $\ell \nu qq$ channel
- Hadronic decay is reconstructed as either:
  - Two $R=0.4$ jets (resolved channel)
  - One $R=1.0$ jet (merged channel)
    - Remove pile-up contribution with trimming
    - Use $p_T$ depended $W/Z$-tagger in combined mass and $D_2^{\beta=1}$
- Systematics derived from conservative estimates based on 13TeV analysis
- Backgrounds:
  - Main: $V+$jets, $t\bar{t}$
  - Minor: single-$t$, SM $VV$, Multi-jet
- Signals:
  - SM electro-weak VBS
  - aQGC
Status

Current Status:
- HL-LHC studies
  - Analysis and interpretation tools ready
  - All simulated samples ready minus aQGC signal
- HE-LHC studies
  - Privately producing MC
  - Comparing DELPHES with ATLAS smearing function
- This analysis runs concurrently with overlapping exotic diboson resonance search

Manpower:
- 2 PhD students, 1 researcher, 1 faculty
  - Tatsumi Nitta, Robert Les, Viviana Cavaliere, Koji Terashi
- All very active