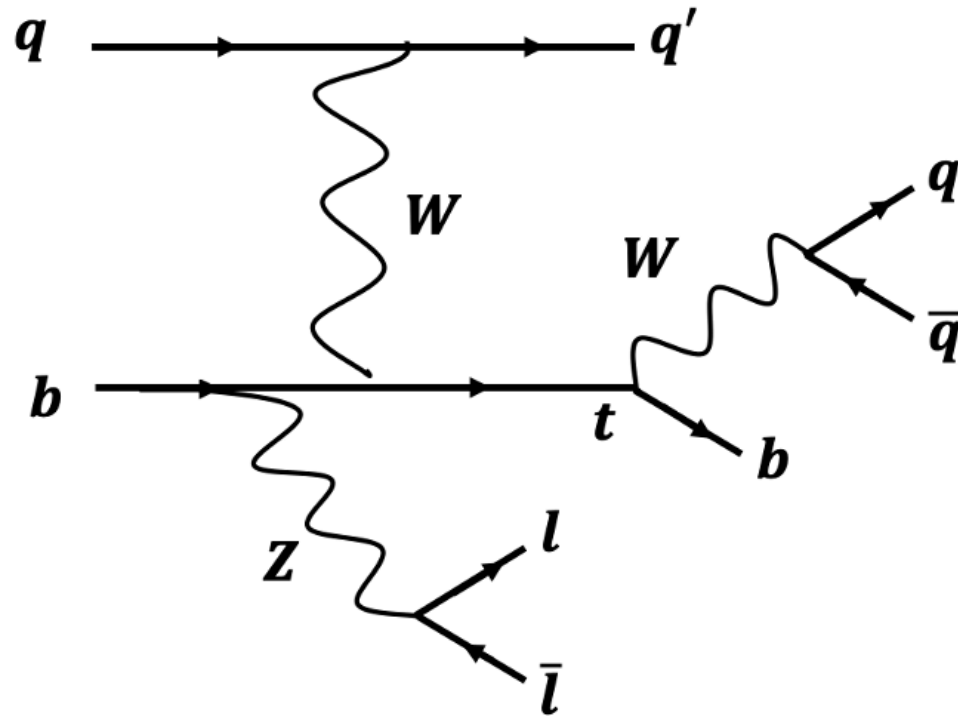


# Search for $tZq$ production in dilepton final states

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# tZq production is a rare, top quark production mechanism predicted by the SM



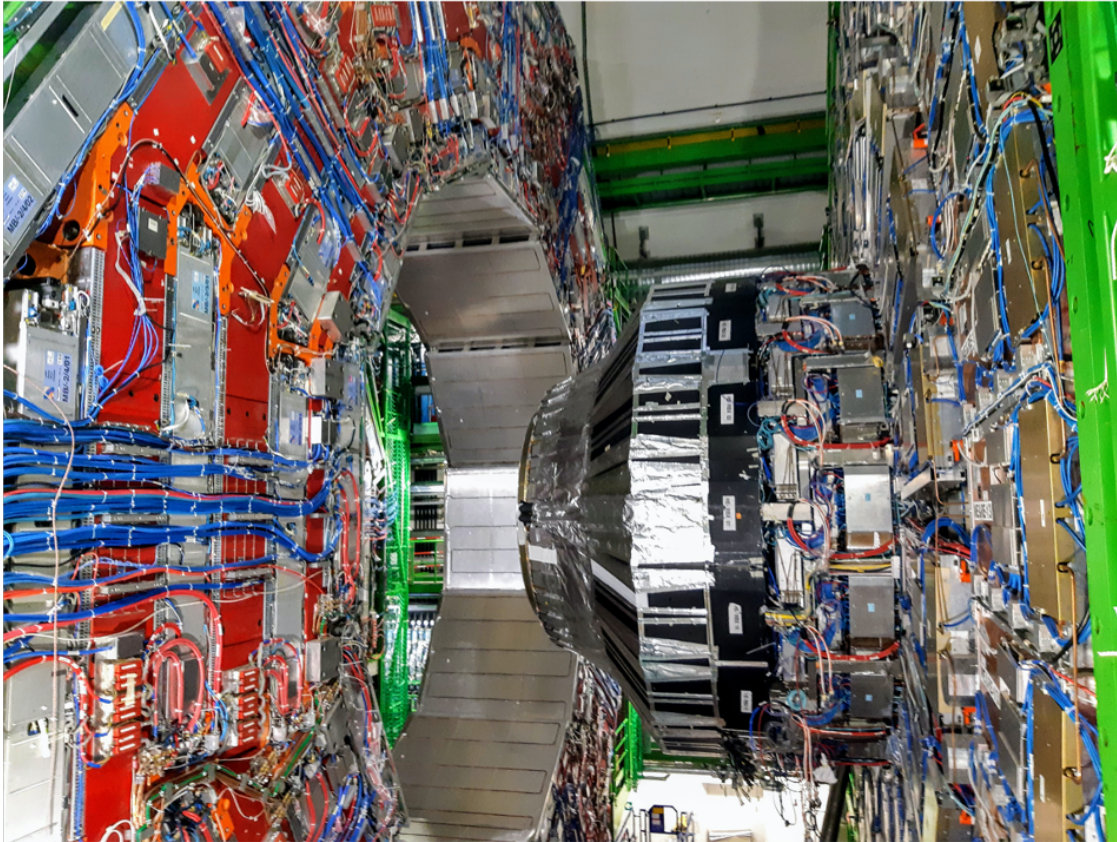
## Top quark mass 172.6 GeV:

- Decays before **hadronization** can occur
- In most cases, decays into a **W boson and a bjet**

## Why tZq?

- Sensitive to **tZ and WWZ couplings**  $\Rightarrow$  probe for electroweak interactions that involve a top quark
- Forms an **irreducible background** to some BSM processes (e.g tZq-FCNC production)

I am analysing Run-2 (2016, 2017 and 2018) simulation samples and data recorded by the CMS detector of the LHC.



After many steps...

Selection criteria (leptons, jets and bjets) and the reconstruction of the W boson, Z boson and top quark candidates

Experimental blinding and non-prompt lepton background estimation

Simulation corrections

Shape uncertainties

Distinguishing between signal-like and background-like events (Boosted Decision Tree)

Rate uncertainties and signal extraction

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# Thank you!