

# Measurement of $ZZ\gamma$ production with the ATLAS detector

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## Abstract

The Standard Model of particle physics predicts the rare production of triboson final states, offering a unique probe of gauge boson self-interactions and sensitivity to anomalous quartic gauge couplings. We present the measurement of  $ZZ\gamma$  production, utilizing the large dataset collected by the ATLAS detector during Run 2. The analysis focuses on the fully leptonic final state,  $pp \rightarrow ZZ\gamma \rightarrow \ell^+\ell^-\ell'^+\ell'^-\gamma$  with  $\ell, \ell' = e$  or  $\mu$ . Evidence for the  $ZZ\gamma$  production has been observed with eight candidate events and an expected background of less than one event. The measured cross-section of  $\sigma_{ZZ\gamma} = 0.144 \pm 0.058$  (stat.)  $\pm 0.006$  (syst.) fb is consistent with Standard Model predictions. To achieve this result, we develop a novel method to estimate the dominant background from non-prompt photons produced within jets, using a jet ratio technique to extrapolate from a high-statistics control region. This talk will summarize the analysis strategy, background estimation, and cross-section measurement, highlighting the potential for future analysis to probe new physics in the electroweak sector.