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Background decomposition in $Z\gamma$ events used in the search for high-mass resonances.

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The study present the measurement of the contribution, purity, of $Z + \gamma$ and Z+ jet background events in the search for high-mass $Z\gamma$ resonances. The study uses events were the Z boson decays into a pairs of oppositely charged electrons or muons. The events used consist of 139 fb⁻¹ of proton-proton, pp, collisions data at $\sqrt{s} = 13$ TeV, recorded by the ATLAS detector at the CERN Large Hadron Collider.

The measured purity of $Z + \gamma$ background events depends on the parameter R that gives the correlation between the isolation and identification criteria for jets faking photons in Z+ jet events. A data-driven method that uses $\gamma\gamma$ events collected in the same detector conditions as the $Z\gamma$ events is used to determine R in various bins of the photon transverse momentum or the invariant mass bins. The results are compared against results that are obtained using the R computed using a Z+jet Monte Carlo sample and a data-driven method that uses $Z + \gamma$ events to estimate R.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award; (Hons, MSc, PhD, N/A)?

PhD

Primary author: RAPHEEHA, Phuti Ntsoko (University of the Witwatersrand)

Co-authors: MOKGATITSWANE, Gaogalalwe (University of the Witwatersrand); Dr DAHBI, Salah-Eddine (University of the Witwatersrand); RUAN, XIFENG (University of the witwatersrand); MELLADO, Bruce (University of the Witwatersrand)

Presenter: RAPHEEHA, Phuti Ntsoko (University of the Witwatersrand)

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