Contribution ID: **106** Type: **not specified**

Low-mass diphoton resonances search with the ATLAS detector at 13 TeV

Thursday, 20 December 2018 16:45 (15 minutes)

Several models beyond the standard model (BSM) predict new resonances decaying into two photons. The diphoton final state has the advantage of a clean experimental signature with an excellent mass resolution and moderate background. Using this final state, the CMS Collaboration observed a small excess near 95 GeV with a local (global) significance of 2.8 (1.3) standard deviations when combining data recorded at 8 TeV and 13 TeV. A search for a narrow diphoton resonance X of mass mX is also performed by ATLAS experiment in the low-mass range 65 to 110 GeV, below the SM Higgs boson mass of 125 GeV, using 80 fb^{-1} of pp collision data recorded at 13 TeV at the Large Hadron Collider. In this range, in addition to the smoothly falling continuum background composed of photon pairs (γγ), as well as photon–jet (γj) and jet pairs (jj) with mis-identified jets, a Drell-Yan (DY) component is present. The events are split into three categories depending on how the two photon candidates are reconstructed. A model composed of analytic functions that describe the signal and background (including γγ, γj, jj and DY) is fit to the measured diphoton mass spectrum to search for narrow resonances.
The dominant uncertainties arise from the uncertainty due to the choice of analytic functions to model the continuum background. No significant excess with respect to the Standard Model expectation is found in ATLAS experiment, and a limit at the 95% confidence level is set on narrow resonance fiducial cross-section times branching ratio ranging from 30 to 101 fb.

Type

Parallel talk

Sessions (parallel only)

Beyond Stand Model

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Session Classification: Beyond Standard Model

Track Classification: Beyond Standard Model