

Search for resonances in the diphoton channel at the ATLAS experiment of the Large Hadron Collider.

A variety of new physics models involving extra dimensions predict photons in the final states from pp collisions at energies accessible at the Large Hadron Collider. The search for new particles in the diphoton channel, such as the Kaluza-Klein resonant mode of the graviton in the Randall-Sundrum model, carried out by the ATLAS experiment is presented. Event selection and optimization, as well as data-driven methods for estimating reducible and irreducible backgrounds and efficiencies are discussed. Particular emphasis is given to the statistical treatment for the contrast of the null and alternative hypothesis. The data sample of pp collisions at $\sqrt{s} = 7$ TeV collected by the ATLAS experiment with the integrated luminosity expected by July 2011, allows exploring new parameter regions beyond Tevatron, providing the possibility for evidence of new physics as well as the establishment of the most stringent bounds on the production cross section times branching ratio for the Randall-Sundrum graviton as a function of diphoton mass.

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