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First measurement of photon+b production cross sections in pp collisions using the ATLAS detector (student talk)

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The production of a photon in association with a bottom quark in proton collisions is sensitive to the bottom quark content of the proton and to the modelling of b quarks in perturbative QCD calculations. A firm understanding of these aspects is required to properly describe background contributions to new physics interactions at high energies involving b quarks. Differential cross sections of this process in proton-proton collisions at $\sqrt{s}=8$ TeV are measured with the ATLAS detector. The cross sections are differential in the photon transverse energy and are measured separately in two regions of absolute photon pseudorapidity. The total relative uncertainty in the measurements is of the order of 20% in most of the energy range. Ratios of the cross sections between the two regions are also measured as a way to reduce correlated systematic uncertainties. The measurements are compared to next-to-leading order predictions in perturbative QCD in two different calculation schemes. The predictions underestimate the data at the highest energies measured by up to a factor of two. These cross-section measurements mark the first time this process is measured in proton-proton collisions [Phys. Lett. B 776 (2018) 295].

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