Title: Measurement of the B_d^0 meson lifetime at ATLAS detector

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Abstract: The lifetime of B_d^0 mesons is determined from their decays $B_d^0 \to J/\psi K^{*0}$ reconstructed in ATLAS experiment at the LHC using pp collision data at a center-of-mass energy of 7 TeV and corresponding to integrated luminosity of 40 pb^{-1}. The lifetime, extracted from the simultaneous unbinned maximum likelihood mass-lifetime fit, is 1.51 ± 0.04 (stat.) ± 0.04 (syst.) ps. A total number of 2750 ± 90 (stat.) signal B_d^0 decays are observed in the measurement, with a fitted B_d^0 mass of 5363.7 ± 1.2 (stat.) MeV. Both the extracted B_d^0 meson mass and lifetime are within the determined errors consistent with the world average values. Although the achieved precision is still significantly lower than the one of the world average value, the measurement successfully tested the feasibility of the fit-method and allowed to cross-check ATLAS detector performance.

Keywords: CERN, LHC, ATLAS, B-physics, B-hadron, Lifetime