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Observation of the χb1 (3P) and χb2 (3P) and Measurement of their Masses (Article) (Open Access)

Sirunyan, A.M.[a], Tumasyan, A.[a], Adam, W.[b], Ambrogi, F.[b], Asilar, E.[b], Bergauer, T.[b], Brandstetter, J.[b], Dragicevic, M.[b], Erö, J.[b], Escalante Del Valle, A.[b], Flechl, M.[b], Frühwirth, R.[b,gy], Ghete, V.M.[b], Hrubec, J.[b], Jeitler, M.[b,gy], Krammer, N.[b], Krätschmer, I.[b], Liko, D.[b], Madlener, T.[b], Mikulec, I.[b], Rad, N.[b],

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Abstract

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The χb1(3P) and χb2(3P) states are observed through their (3S)γ decays, using an event sample of proton-proton collisions collected by the CMS experiment at the CERN LHC. The data were collected at a center-of-mass energy of 13 TeV and correspond to an integrated luminosity of 80.0 fb-1. The (3S) mesons are identified through their dimuon decay channel, while the low-energy photons are detected after converting to e+e- pairs in the silicon tracker, leading to a χb(3P) mass resolution of 2.2 MeV. This is the first time that the J=1 and 2 states are well resolved and their masses individually measured: 10513.42±0.41(stat)±0.18(syst) MeV and 10524.02±0.57(stat)±0.18(syst) MeV; they are determined with respect to the world-average value of the ~(3S) mass, which has an uncertainty of 0.5 MeV. The mass splitting is measured to be 10.60±0.64(stat)±0.17(syst) MeV. © 2018 CERN.

SciVal Topic Prominence

Topic: mesons | decay | heavy meson

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Engineering uncontrolled terms: A-center, Average values, Decay channels, Integrated luminosity, Low energy photons, Mass resolution, Proton proton collisions, Silicon tracker

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