FIG. 1: The dielectron invariant mass for $J/\psi \rightarrow e^+e^-$ for an integrated luminosity of 0.41 fb^{-1}. Using software release light-1904-elbe on the bucket4 and bucket6 hadron skims, the selection criteria are as follows: $|d_0| < 0.5$ cm, $|z_0| < 3.0$ cm and nCDCHits > 10 for each electron candidate. A bremsstrahlung correction is applied by adding the momentum and cluster energy of a photon with $E < 1.0$ GeV within a $5°$ cone of the electron candidate.
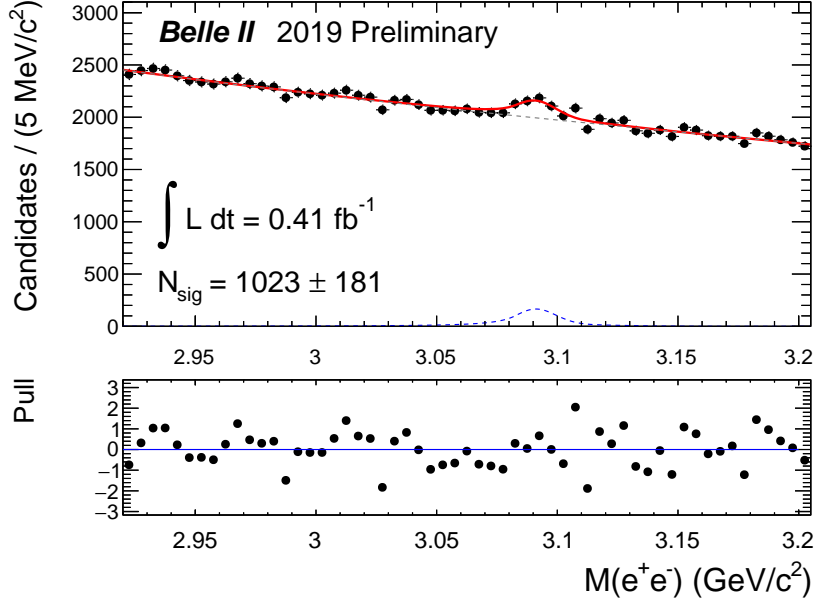
FIG. 2: The dielectron invariant mass for $J/\psi \to e^+e^-$ for an integrated luminosity of 0.41 fb^{-1} with the same selection criteria as FIG. 1. A Crystal Ball function and a bifurcated Gaussian was fit to the signal and a second order Chebychev polynomial for the background. The number of background events within the mass window $[3.06, 3.12]$ GeV/c^2 is estimated to be 23964 ± 55.

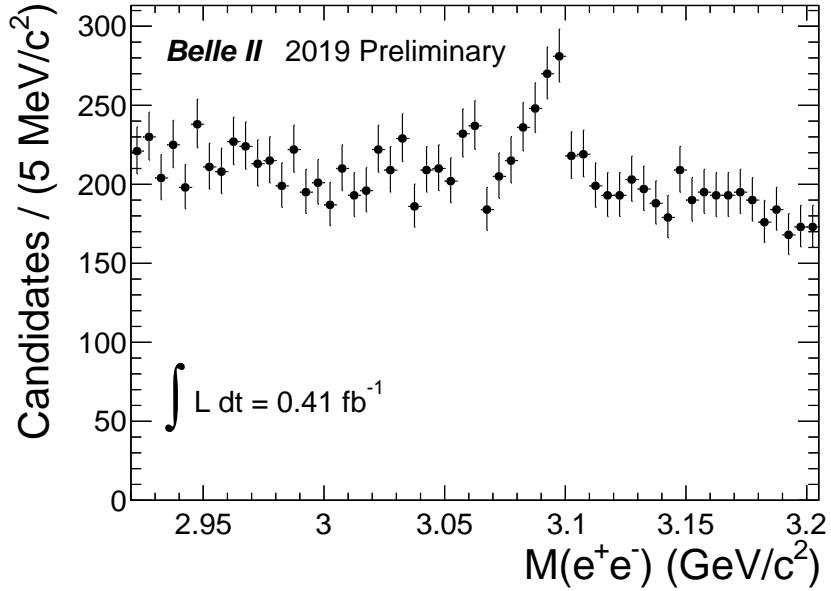FIG. 3: The dielectron invariant mass for $J/\psi \to e^+e^-$ for an integrated luminosity of 0.41 fb^{-1}, using the same selection criteria as FIG. 1 and applying a cut of (global) electronID > 0.95 to one electron candidate.
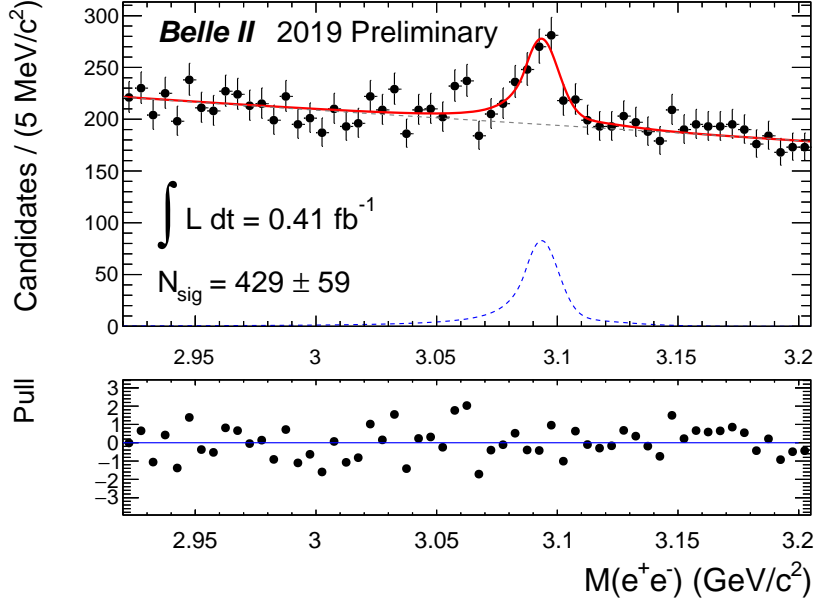
FIG. 4: The dielectron invariant mass for $J/\psi \to e^+e^-$ for an integrated luminosity of 0.41 fb^{-1} with the same selection criteria as FIG. 3. The number of background events within the mass window $[3.06, 3.12]$ GeV/c^2 is estimated to be 2346 ± 18.
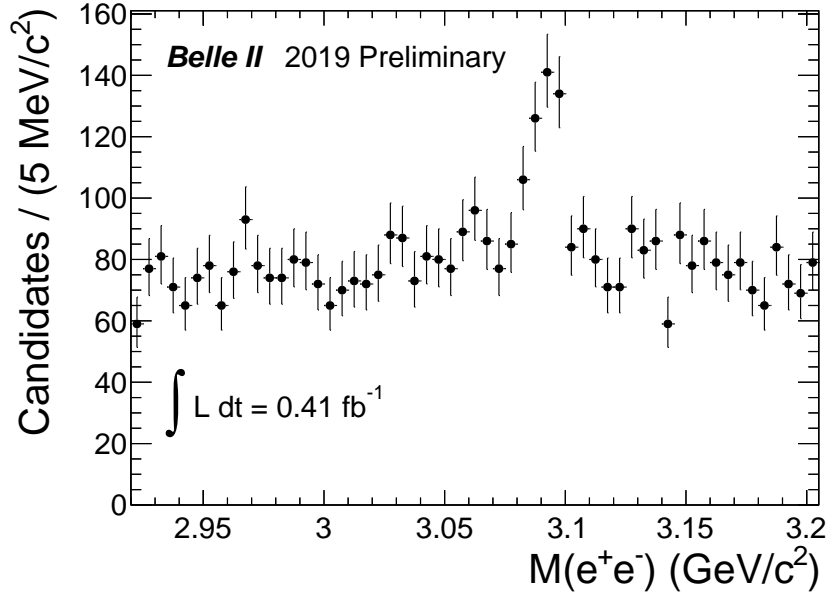

FIG. 5: The dielectron invariant mass for $J/\psi \to e^+e^-$ for an integrated luminosity of 0.41 fb^{-1}, using the same selection criteria as FIG. 1 and applying a cut of (global) electronID > 0.95 to both electron candidates.
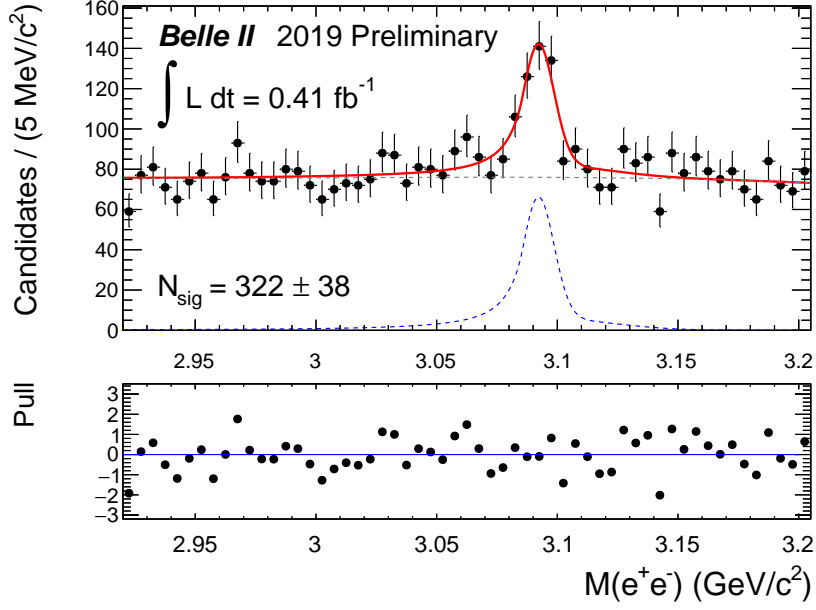
FIG. 6: The dielectron invariant mass for $J/\psi \to e^+e^-$ for an integrated luminosity of 0.41 fb^{-1} with the same selection criteria as FIG. 5. The number of background events within the mass window $[3.06, 3.12]$ GeV/c^2 is estimated to be 912 ± 11.
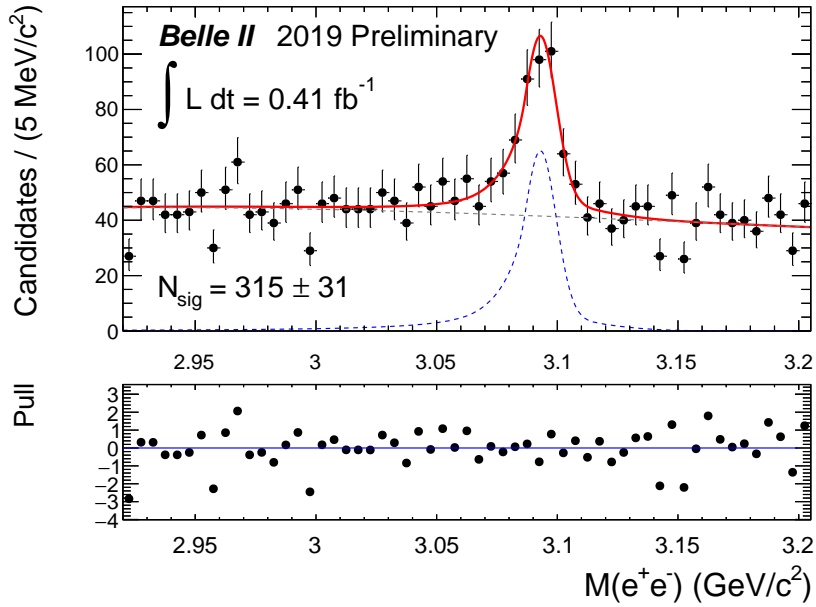

FIG. 7: The dielectron invariant mass for $J/\psi \to e^+e^-$ for an integrated luminosity of 0.41 fb^{-1} with the same selection criteria as FIG. 5 as well as a vertex fit with TreeFit, requiring a confidence level of > 0.001. The number of background events within the mass window $[3.06, 3.12]$ GeV/c^2 is estimated to be 499 ± 8.

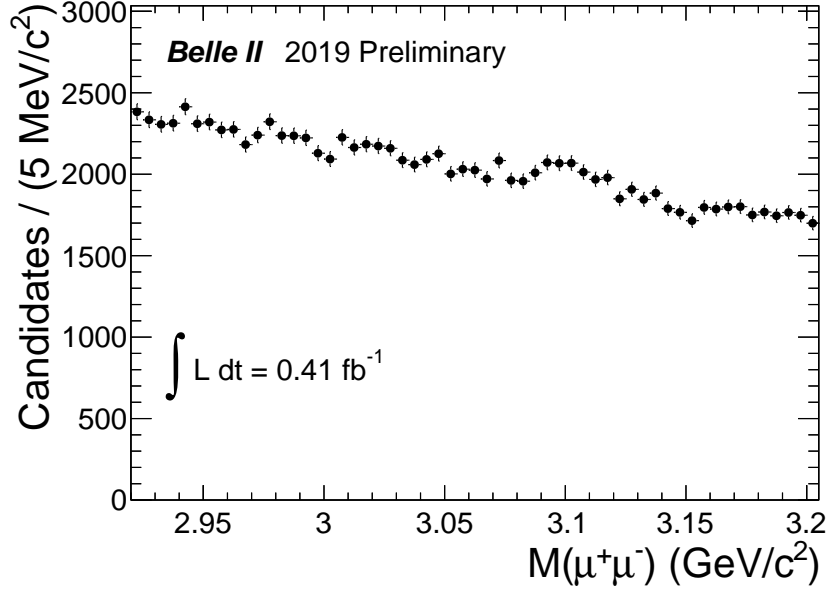FIG. 8: The dimuon invariant mass for $J/\psi \to \mu^+\mu^-$ for an integrated luminosity of 0.41 fb^{-1}. Using software release light-1904-elbe on the bucket4 and bucket6 hadron skims, the selection criteria are as follows: $|d_0| < 0.5$ cm, $|z_0| < 3.0$ cm and nCDCHits > 10 for each muon candidate.
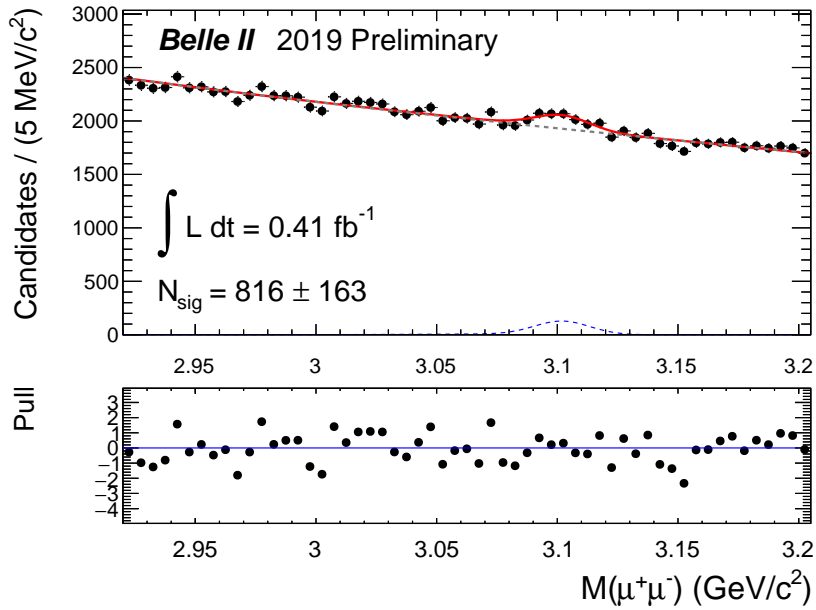

FIG. 9: The dimuon invariant mass for $J/\psi \to \mu^+\mu^-$ for an integrated luminosity of 0.41 fb^{-1} with the same selection criteria as FIG. 8. A Gaussian function and a bifurcated Gaussian was fit to the signal and a second order Chebychev polynomial for the background. The number of background events within the mass window $[3.06, 3.12]$ GeV/c^2 is estimated to be 23467 ± 55.
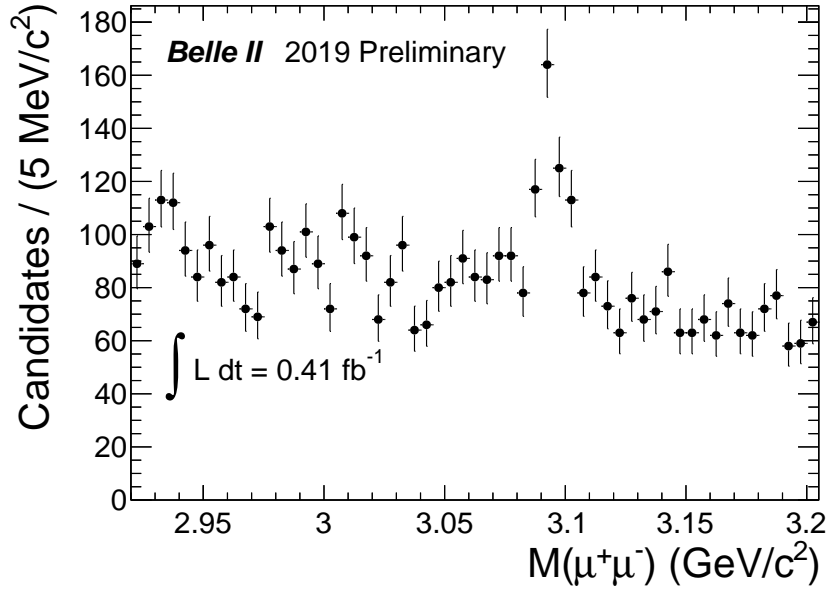
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FIG. 10: The dimuon invariant mass for $J/\psi \to \mu^+\mu^-$ for an integrated luminosity of 0.41 fb^{-1}, using the same selection criteria as FIG. 8 and applying a cut of (global) muonID > 0.95 to one muon candidate.

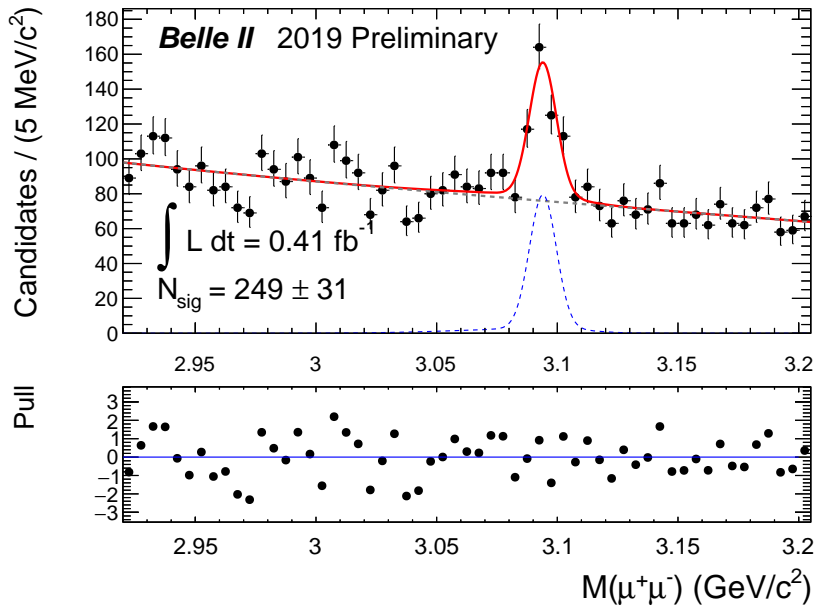FIG. 11: The dimuon invariant mass for $J/\psi \to \mu^+\mu^-$ for an integrated luminosity of 0.41 fb^{-1} with the same selection criteria as FIG. 10. The number of background events within the mass window [3.06, 3.12] GeV/c^2 is estimated to be 917 ± 11.

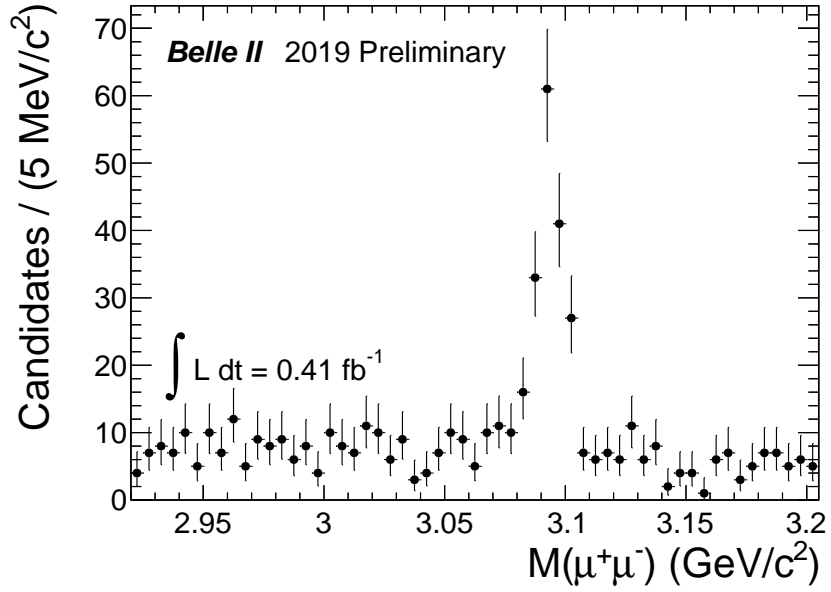FIG. 12: The dimuon invariant mass for $J/\psi \to \mu^+\mu^-$ for an integrated luminosity of 0.41 fb^{-1}, using the same selection criteria as FIG. 8 and applying a cut of (global) muonID > 0.95 to both muon candidates.
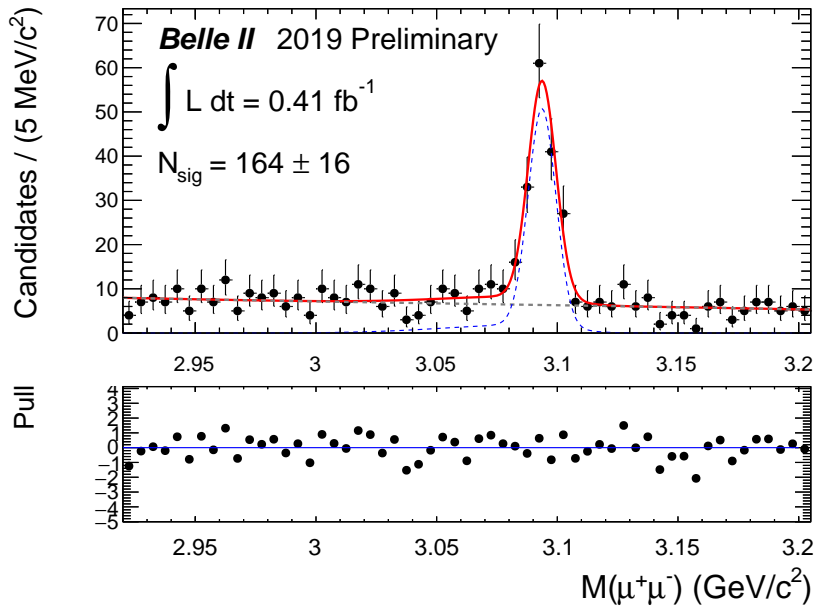

FIG. 13: The dimuon invariant mass for $J/\psi \to \mu^+\mu^-$ for an integrated luminosity of 0.41 fb^{-1} with the same selection criteria as FIG. 12. The number of background events within the mass window $[3.06, 3.12]$ GeV/c^2 is estimated to be 76 ± 3.
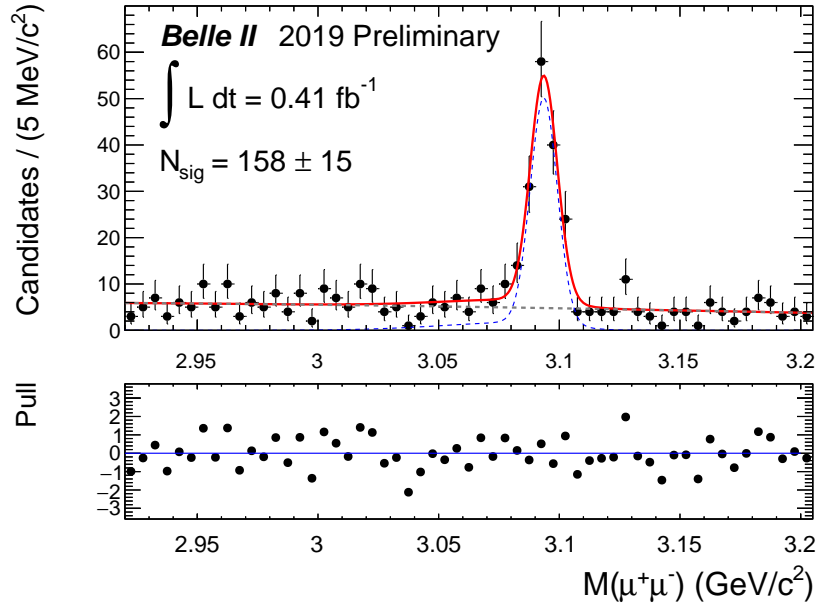
FIG. 14: The dimuon invariant mass for $J/\psi \rightarrow \mu^+\mu^-$ for an integrated luminosity of 0.41 fb^{-1} with the same selection criteria as FIG. 12 as well as a vertex fit with TreeFit, requiring a confidence level of > 0.001. The number of background events within the mass window $[3.06, 3.12]$ GeV/c^2 is estimated to be 58 ± 3.