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Measurement of mass dependence of the transverse momentum of lepton pairs in Drell-Yan production in proton-proton collisions at $\sqrt{s} = 13$ TeV

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The double differential cross sections of the Drell-Yan lepton pair ($\ell^+ \ell^-$, dielectron or dimuon) production, as functions of the invariant mass $m_{\ell\ell}$, transverse momentum $p_T(\ell\ell)$, and φ^* , are measured. The φ^* observable is highly correlated with $p_T(\ell\ell)$ and is used to probe the low- $p_T(\ell\ell)$ region in a complementary way. Dilepton masses up to 1 TeV are investigated. Additionally, a measurement is performed requiring at least one jet in the final state. To benefit from partial cancellation of the systematic uncertainty, the ratios of the differential cross sections in $p_T(\ell\ell)$ and φ^* for different $m_{\ell\ell}$ ranges over the ones in the \sqrt{s} mass peak interval are presented. The collected data correspond to an integrated luminosity of 36.3 fb^{-1} of proton-proton collisions recorded with the CMS detector at the LHC at a center-of-mass energy of 13 TeV in 2016. Measurements are compared to state-of-the-art predictions based on perturbative quantum chromodynamics, including soft-gluon resummation.

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