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# Precise SM measurements as BSM probes: a new purpose for the W-mass measurement

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Precision measurements of Standard Model (SM) parameters are valuable multipurpose probes for heavy new physics and check the consistency of the Standard Model. We propose a new purpose for precision SM measurements: constraining light new physics that can impact kinematic distributions used in measuring SM parameters. To illustrate this, we consider the W mass measurement, where new physics could contaminate the semi-invisible leptonic decay of the W, leading to modifications in the missing transverse energy (MET) and kinematic distributions used for W mass extraction. We explore the three ways in which new physics can affect the measured sample: modifying W production and decay processes while resulting in the same lepton+MET final state, or producing lepton+MET final states without an on-shell W. We present BSM models for each scenario and showcase how BSM parameters can be constrained by comparing the shapes of SM templates of kinematic distributions to the polluted distributions incorporating BSM effects.

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