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Absorbing systematic effects to obtain a better background model in a search for new physics

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This contribution discusses a novel approach to estimate the Standard Model backgrounds based on modifying Monte Carlo predictions within their systematic uncertainties. The improved background model is obtained by altering the original predictions with successively more complex correction functions in signal-free control selections. Statistical tests indicate when sufficient compatibility with data is reached. In this way, systematic effects are absorbed into the new background model. The same correction is then applied on the Monte Carlo prediction in the signal region. Comparing this method to other background estimation techniques shows improvements with respect to statistical and systematic uncertainties. The proposed method can also be applied in other fields beyond high energy physics.

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