

Using the W as a Standard Candle to Reach the top

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Precision measurements of the top quark mass at hadron colliders have been notoriously difficult. Energy-Energy Correlators (EECs) provide clean access to angular correlations in the hadronic energy flux, but their application to the precision mass measurements is less direct since they measure a dimensionless angular scale.

Inspired by the use of standard candles in cosmology, I will show that a single EEC-based observable can be constructed that reflects the characteristic angular scales of both the W -boson and top quark masses. This gives direct access to the dimensionless quantity m_t/m_W , from which m_t can be extracted in a well-defined short-distance scheme as a function of the well-known m_W . I will demonstrate several remarkable properties of this observable as well as its statistical feasibility. This proposal provides a road map for a rich program for top mass determination at the LHC with record precision.

Based on arXiv:2311.02157 and arXiv:2201.08393

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