Contribution ID: **112**   Type: **Oral**

Electroweak splitting functions and high energy shower

Thursday 23 May 2019 17:40 (20 minutes)

We derive the electroweak (EW) collinear splitting functions up to single logs. We first derive the splitting functions in the unbroken limit, and then we systematically incorporate effects of EW symmetry breaking (EWSB), by imposing a particularly convenient gauge choice (dubbed "Goldstone Equivalence Gauge") that disentangles the effects of Goldstone bosons and gauge fields in the presence of EWSB. As a result, we are able to derive splitting functions up to leading power corrections in v/k_T. We also implement a comprehensive, practical EW showering scheme based on these splitting functions using a Sudakov evolution formalism. The implementation of EW showering includes novel features such as "ultra-collinear" splittings, matching between shower and decay, and mixed-state evolution of neutral bosons ($\gamma/Z/h$) using density-matrices, kinematic back-reaction corrections in multi-stage showers. We demonstrate those new phenomena and features at $O(1$–10 TeV) energies with some examples.

Primary authors: Dr CHEN, Junmou (Korean Institute for Advanced Study); HAN, Tao (University of Pittsburgh); TWEEDIE, Brock (University of Pittsburgh)

Presenter: Dr CHEN, Junmou (Korean Institute for Advanced Study)

Session Classification: Electroweak, Top and Higgs Physics

Track Classification: Electroweak, Top and Higgs Physics