

1 Neutral Pion and η Meson Reconstruction with
2 the sPHENIX Detector

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4 sPHENIX is a new detector at the Relativistic Heavy-Ion Collider (RHIC)
5 designed to make precision jet and upsilon measurements in 200 GeV $p + p$,
6 $p + Au$, and $Au + Au$ collisions and will begin taking data in 2023. In addition
7 to having the first hadronic calorimeter (HCal) at mid-rapidity at RHIC,
8 sPHENIX also contains a tungsten-scintillator based Electromagnetic Calorimeter
9 (EMCal) for measuring the energy of photons and electrons. Before physics
10 analyses can take place using the EMCal, however, it must be calibrated to the
11 electromagnetic energy scale, and this will be done by calibrating the EMCal's
12 response relative the neutral pion's (π^0) invariant mass. π^0 's are reconstructed
13 from pairs of EMCal clusters that were produced by a π^0 's decay photons and
14 that pass a set of quality cuts; however, due to cluster merging effects, this
15 pairing procedure is not practical above $p_T \approx 10$ GeV/c for π^0 's. Thus, as
16 a high-energy cross-check on the energy scale calibration, the calorimeter's response
17 relative to η mesons, whose heavier mass allows for reliable reconstruction
18 beyond 20 GeV/c, will also be measured. The EMCal's successful calibration
19 will then segue into the measurement of the π^0 and η meson spectra, which will
20 take advantage of both sPHENIX's large acceptance and the high luminosity
21 200 GeV $Au + Au$ data set currently being recorded. This poster will show
22 the status of the sPHENIX EMCal's energy scale calibration and of sPHENIX's
23 first neutral meson analyses.