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Detailed study of Upsilon suppression with the measurement of the $\Upsilon(3S)$ meson in PbPb collisions at 5.02 TeV in CMS

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Because of the different binding energies, bottomonium mesons are particularly useful probes to understand the thermal properties of quark-gluon plasma. Previously, CMS observed the sequential suppression of $\Upsilon(1S)$, $\Upsilon(2S)$, and $\Upsilon(3S)$ in heavy ion (AA) collisions, which was widely accepted as evidence for the QGP formation. However, the $\Upsilon(3S)$ yield was excessively low, thus allowing us to report only statistical upper limits. In this talk, we present a detailed study of the measurement of excited bottomonium states with improved analysis technique and high-statistics data that enables us to observe the $\Upsilon(3S)$ meson in AA for the first time. The results are discussed together with the previous measurements in pPb collisions, which finally provides a full scan of all $\Upsilon(nS)$ states over the whole phase space.

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