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## Forward rapidity $\psi(2S)$ production in pp, p-Pb and Pb-Pb collisions with ALICE at the LHC

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The ALICE Collaboration has studied the inclusive  $\psi(2S)$  production in pp, p-Pb and Pb-Pb collisions at the CERN LHC. The  $\psi(2S)$  is detected through its decay to muon pairs, using the Forward Dimuon Spectrometer, which covers the rapidity range  $2.5 < y_{lab} < 4$ . The  $\psi(2S)$  production cross sections in pp collisions will be presented, both integrated and differential in rapidity and in transverse momentum. In p-Pb collisions,  $\psi(2S)$  results will be compared to the  $J/\psi$  ones by means of the production cross sections ratio studied as a function of the transverse momentum and event activity. The  $\psi(2S)$  nuclear modification factor,  $R_{pA}$ , will also be presented. The results show a larger  $\psi(2S)$  suppression compared to the one observed for the  $J/\psi$  and are not described by theoretical models including cold nuclear matter effects as nuclear shadowing and energy loss. Finally, preliminary results on  $\psi(2S)$  production in Pb-Pb collisions will be shown in two  $p_T$  ranges as a function of centrality. Also in this case, the  $\psi(2S)$  production will be compared to the  $J/\psi$  one and to the corresponding pp results.

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