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# Combinations of single-top-quark production cross-section measurements and vertical bar f(LV)V(tb)vertical bar determinations at root s=7 and 8 TeV with the ATLAS and CMS experiments

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## Abstract

This paper presents the combinations of single-top-quark production cross-section measurements by the ATLAS and CMS Collaborations, using data from LHC proton-proton collisions at  $\sqrt{s} = 7$  and 8 TeV corresponding to integrated luminosities of 1.17 to 5.1 fb<sup>-1</sup> at  $\sqrt{s} = 7$  TeV and 12.2 to 20.3 fb<sup>-1</sup> at  $\sqrt{s} = 8$  TeV. These combinations are performed per centre-of-mass energy and for each production mode: t-channel, tW, and s-channel. The combined t-channel cross-sections are 67.5  $\pm$  5.7 pb and 87.7  $\pm$  5.8 pb at  $\sqrt{s} = 7$  and 8 TeV respectively. The combined tW cross-sections are 16.3  $\pm$  4.1 pb and 23.1  $\pm$  3.6 pb at  $\sqrt{s} = 7$  and 8 TeV respectively. For the s-channel cross-section, the combination yields 4.9  $\pm$  1.4 pb at  $\sqrt{s} = 8$  TeV. The square of the magnitude of the CKM matrix element V<sub>tb</sub> multiplied by a form factor f(LV) is determined for each production mode and centre-of-mass energy, using the ratio of the measured cross-section to its theoretical prediction. It is assumed that the top-quark-related CKM matrix elements obey the relation |V<sub>td</sub>|, |V<sub>ts</sub>| << |V<sub>tb</sub>|. All the |f(LV)V(tb)|<sup>2</sup> determinations, extracted from individual ratios at  $\sqrt{s} = 7$  and 8 TeV, are combined, resulting in |f(LV)V(tb)| = 1.02  $\pm$  0.04 (meas.)  $\pm$  0.02 (theo.). All combined measurements are consistent with their corresponding Standard Model predictions.

## Keywords

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