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## Measurement of the $t$ -channel single top-quark cross sections with the ATLAS detector

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The production of single top quarks at the LHC is dominated by the  $t$ -channel exchange of a virtual  $W$  boson that is emitted by a light quark inside one of the colliding protons.

Thus, the measurement of the top-quark and top-antiquark production cross sections is sensitive to the  $u$ -quark PDF and the  $d$ -quark PDF and can provide complementary input to constrain these PDF, complementary to other high- $p_T$  processes.

Furthermore, the cross section is proportional to the square of the CKM matrix element  $|V_{tb}|$  and the measurement can thus provide additional input to constrain the quark mixing matrix without assumptions on the number of quark generations.

In this measurement neural networks are used to separate the  $t$ -channel signal from the backgrounds after an event selection. Results for  $t$ -channel single top-quark production are presented at a center of mass energy of

$\sqrt{s} = 7$   
 $tev$  and  $\sqrt{s} = 8$   
 $tev$ .

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