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Study of the $W+c$ process with the ATLAS experiment

The production of a W boson in association with a c -quark is a key process to probe the s -quark content of the proton. Dominated by strange-gluon scattering, its cross section provides direct sensitivity to the strange parton distribution function. Previous ATLAS and CMS measurements were consistent with theoretical predictions, but higher-statistics studies are required to improve precision.

This work presents the ATLAS analysis of Run 2 data for $W + c$ production. The strategy includes event selection, background estimation, and corrections for detector effects through binned likelihood fits and unfolding. Preliminary results are shown, offering the first insight into $W + c$ production in Run 2 and its implications for the strange-quark PDF.

In parallel, theoretical efforts aim to include charm-mass effects in $W + c$ production, with progress on numerical implementation of mass corrections and preliminary results for $W + c + c$ production relevant for background modelling.

Primary authors: REBUZZI, DANIELA (Università di Pavia e INFN, Sezione di Pavia); DAL FIUME, Dario; MANCO, Giulia; CRESTA, Tommaso

Presenters: REBUZZI, DANIELA (Università di Pavia e INFN, Sezione di Pavia); CRESTA, Tommaso

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