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Dark Matter in Association with a Single Top

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Dark matter scenarios with spin-0 mediators in the s-channel have be tested in well-established processes with missing energy, such as top-pair- and mono-jet-associated production. We suggest electroweak single top production in association with a dark matter pair as an alternative channel. Based on a realistic analysis for the LHC at 13 TeV, we demonstrate how to discriminate between the signal and Standard-Model background using event kinematics. With 300 fb⁻¹ (3 ab⁻¹) of data, on-shell scalar mediators with a coupling strength gSt = 1 to top quarks can be probed up to masses of 180 (360) GeV. Single-top-associated dark matter production should thus be included as an independent search channel in the LHC dark matter program.

Primary authors: THOMPSON, Jennifer (ITP Heidelberg); PLEHN, Tilman (Heidelberg University); WEST-HOFF, Susanne (Heidelberg University)

Presenter: THOMPSON, Jennifer (ITP Heidelberg)

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