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Single top quark production at ultra-high energies

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The processes with single top quark production provide a prototype search for the types of final state that are expected in many new physics scenarios. Some distinctive features are considered for particle production in the top sector in ultra-high energy domain which can be covered partly in the collisions of cosmic ray particles with atmosphere. The single top quark production through electroweak interaction is studied within the Standard model and the Effective field theory approach used for calculations of total partonic cross sections. These quantitative results can be important for both the future collider experiments at center-of-mass energy frontier and the improvement of the phenome-nological models for development of the cosmic ray cascades in ultra-high energy domain. Thus the study allows the better understanding of heavy particle production and emphasizes the exciting interrelation between the high-energy physics on accelerators and ultra-high energy cosmic ray measurements.

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