

# Deep learning for the rare top decay $t \rightarrow sW$ at the LHC

Wednesday 31 January 2024 15:40 (5 minutes)

The Cabibbo Kobayashi Maskawa (CKM) matrix describes the flavor-changing quark interactions.  $V_{ts}$  is the matrix element that describes the coupling between the top and strange quark, has not been directly measured. A direct measurement of  $|V_{ts}|$  can be performed by identifying the strange jets from top decays. The strange jet tagging problem is challenging due to the similarity of strange jets and light jets. When tagging the strange jet decaying from top quarks, both the jet properties and topology of the event can be considered. For this task, we employ a deep-learning model, SAJA (Self-Attention for Jet Assignment), based on the self-attention mechanism that can utilize all event topology and jet properties. The SAJA model finds the jets decaying from  $t \rightarrow sW$  in the Dileptonic top pair production using the whole event information.

**Authors:** WATSON, Ian James (University of Seoul); PARK, Inkyu (University of Seoul, Department of Physics (KR)); LEE, Jason (University of Seoul (KR)); HEO, Jeewon (University of Seoul, Department of Physics (KR)); YANG, Seungjin (Kyung Hee University (KR)); JANG, Woojin (University of Seoul, Department of Physics (KR)); ROH, Youn Jung (University of Seoul, Department of Physics (KR))

**Presenter:** HEO, Jeewon (University of Seoul, Department of Physics (KR))

**Session Classification:** Poster Session

**Track Classification:** 2 ML for analysis : event classification, statistical analysis and inference, including anomaly detection