

Secret interactions of neutrinos with light new gauge bosons, Z^\prime , can lead to a rich phenomenology in supernova explosion as well as in the early universe. This interaction can also lead to new decay modes for charged mesons, $\pi^+ (K^+) \rightarrow e^+ \nu Z^\prime$ and subsequently to $Z^\prime \rightarrow \nu \bar{\nu}$. After demonstrating that such interaction can be accommodated within viable electroweak symmetric models, I will explain how the Near Detector (ND) of DUNE can probe this scenario. I will also discuss how DUNE ND can make it possible to reconstruct the flavor structure of the Z^\prime coupling to neutrinos.