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Contributions of flavor violating couplings of a Higgs boson to $pp \rightarrow WW$

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We study contributions to $pp \rightarrow W^+W^- \rightarrow \ell\nu_\ell\ell'\nu_{\ell'}$ in models with a new Higgs boson, H , and a neutral lepton, ν_4 , with couplings $H - \nu_4 - \nu_\mu$ and $W - \nu_4 - \mu$ through the process $pp \rightarrow H \rightarrow \nu_4\nu_\mu \rightarrow W\mu\nu_\mu \rightarrow \ell\nu_\ell\mu\nu_\mu$. Contrary to naive expectations, we find that contributions to $pp \rightarrow WW$ can be very large while satisfying constraints from standard $H \rightarrow WW$ and $H \rightarrow \gamma\gamma$ searches. Even the excess observed by ATLAS in $pp \rightarrow WW$, if taken at face value, can be easily accommodated. The various kinematic distributions fit nicely the experimentally determined ones. This scenario can arise for example in a two Higgs doublet model with vectorlike leptons.

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