

# An improved model of UHECR nuclei photomeson interactions

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The case for cosmic ray nuclei at the highest energies has become stronger with recent composition results from the Pierre Auger Observatory and Telescope Array. To understand the origin of these nuclei we need more reliable models of their interactions with photons. The currently used photomeson treatment underestimates the nuclear disruption and overestimates the photoproduction of pions when compared to experimental data. Our new photomeson model improves on these aspects and predicts lighter cosmic ray composition and reduced neutrino fluxes in the sources. These effects are relevant for environments where the photomeson interaction rates dominate at the highest cosmic ray energies. The impact of the model is illustrated in examples of TDEs and GRBs which satisfy this condition. An open source code has been made available which helps implementing the model in other frameworks used by the community.

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