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# On the relevance of the electron-to-proton ratio for high-energy neutrino fluxes

The calculation of the cosmic ray spectrum of a certain source is very difficult as direct observation is not possible in most cases. A common technique uses synchrotron radiation produced in leptonic processes: From the synchrotron measurement, the electron spectrum can be derived, which in astrophysical sources is expected to have a similar spectral behavior to the proton spectrum. Thus, if the electron-proton luminosity ratio K is theoretically known, it is possible to estimate the proton spectrum from leptonic data.

In most literature this ratio is assumed to be approximately K=10-100, which is true in the case of equal spectral indices of proton- and electron-momentumdistribution. Dropping this assumption and using more detailed calculations it turned out that even for slightly different indices, the exact value of K deviates by about one order of magnitude from the conventional ratio with increasing energies.

These new results are of particular importance for different neutrino flux models, in which the observed synchrotron radiation is used to estimate the flux of neutrinos from hadronic interactions. This flux usually scales proportional to K, and therefore, the exact choice of K is very important for those calculations. On our poster, we discuss the consequences of our calculations for neutrino flux predictions and the interpretation of model-dependent neutrino flux limits presented by IceCube.

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