

Are neutrons precursors of solar flares?

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Abstract. The analysis of data of a worldwide network of neutron monitors (NM) shows, that at local noon and during approximately 4 hours after, the NM sometimes register statistically significant excess. Enhancement of count rate is approximately $\approx 1.5 \div 2\%$. Depending on the geographical coordinates the time slice is determined, during which the global increase of a registered ux (characteristic time of the order of tens of hours) is observed. These data are correlated with data from space-borne sensors, proving significant increase ($\approx 5 \div 10$ times) of the low energy protons and electrons in near-earth space. In both cases the ux enhancement during tenths of hours is proceeding by an impulse phase of the next solar are. The analysis of data allows

to put forward a hypothesis that the enhancement of the protons and electrons ux is stipulated by decay of solar neutrons with energies $10 \div 30 \text{ MeV}$. These neutrons during tenths of hours before an impulse phase of a are are born in active areas of the Sun, as a product of thermonuclear reactions ($D + d \rightarrow He^3 + n, T + d \rightarrow He^4 + n$). The part of neutrons are decaying in the interplanetary space, and part of high en-ergy neutrons ($E_n > 20 \text{ V}$) penetrate through terrestrial atmosphere (with probability $\approx 10^{-7}$ and are registered by neutron monitors.

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