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## Neutron ‘thunder’ accompanying the extensive air shower

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Simulations show that neutrons are the most abundant component among extensive air shower (EAS) hadrons. However, multiple neutrons which appear with long delays in neutron monitors nearby the EAS core (‘neutron thunder’) are mostly not the neutrons of the shower but have a secondary origin. The bulk of them are produced by high energy EAS hadrons hitting the monitors. Delays are due to the thermalization and diffusion of neutrons in the moderator and reflector of the monitor accompanied by the production of secondary gamma-quanta. This conclusion raises the important problem of the interaction of EAS with the ground, the stuff of the detectors and their environment. Since they have often the hydrogen-containing materials like polyethylene in neutron monitors, such interaction can give an additional contribution to the signal in the EAS detectors. It can be particularly important for the signal from scintillators or water tank detectors at long distances from the EAS core where neutrons of the shower become a dominant component coming a few microseconds after the shower front.

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