Introduction
The NEVOD-EAS array (MEPhI, Moscow) is aimed at detection of extensive air showers (EAS) with energies of $10^7 - 10^{15}$ eV. It consists of clusters of scintillation counters of EAS electron-photon component particles. The central part of the array consists of 9 clusters. One cluster contains 16 scintillation counters, each 4 counters are combined in detector stations (DS). Each DS counter contains one photomultiplier tube (PMT) that is used for time and EAS particles density measurements. One of the DS counters is equipped with an additional PMT which has a lower gain than the others and extends the DS dynamic range up to $10^8$ particles/m$^2$.

Calibration of the model
During the NEVOD-EAS creation, the characteristics of the scintillators were studied using the muon hodoscope (MH) URAGAN. It provides spatial and angular accuracies of muons track reconstruction better than 1 cm and 1º, respectively. This allows to study the light collection non-uniformity of the counters. The light collection non-uniformity of a set of studied counters is in range of 18–25% and depends weakly on the light yield of the scintillators. It is determined only by the detector housing geometry. To achieve a better accordance between the simulation and experimental results, the light collection non-uniformity of counters was modeled. For this purpose, the results of CORSIKA simulation were used to keep a good fit with the real spectrum of particles. To account the influence of the building roof over the MH, the value of particle energy threshold of 100 MeV was chosen. According to the experimental data, zenith angle was simulated in range of 0° - 15°. Using the simulation results, the matrices of the mean charge of the counter response to passage of a single charged particle were obtained. The simulated light collection non-uniformity (18.2%) is close to the experimental value.

Simulation of the NEVOD-EAS array response to extensive air showers
To check the quality of the model, the array response to the EAS passage was simulated (primary proton, energy of $10^{15}$ eV, zenith angle $\theta = 90°$, azimuthal angle $\phi = 30°$). EAS axis was located in three points in the NEVOD-EAS coordinate system: (0 m, 0 m), (-35 m, -40 m) and (100 m, -100 m).

Density distributions of secondary particles of the considered EAS are shown in the figures on the left. The right parts of the figures show the DS responses in terms of vertical equivalent muon. To provide a better visibility, the color scales of both figure parts are logarithmic. The good accordance between density distributions and array model response is clearly observed.

The result of model
After accounting of the main detector properties and model calibration, the good fits have been achieved. The most probable simulated charge of the counter response is 49.6 pC, while the experimental value is 51.6 pC.

Conclusion
- a Geant4 model of the NEVOD-EAS air-shower array was created;
- the model was calibrated according to experimental data; based on calibration, a good agreement between the simulation and the experimental results was obtained;
- the response of the NEVOD-EAS array to the passage of the extensive air shower was simulated.

The developed model provides the opportunity to study the characteristics of the detector response to the passage of particles. It can be used for improving of the quality of applied data analysis and processing methods, as well as for testing the currently used techniques for the reconstruction of EAS parameters.

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Purpose of the work
The work is aimed at creation of a model of the NEVOD-EAS detector station using the Geant4 program package. It was necessary to solve the problem of reconstruction better than 1 cm and 1º, respectively. This allows to study the light collection non-uniformity of a set of studied counters. The light collection non-uniformity of a set of studied counters is in range of 18–25% and depends weakly on the light yield of the scintillators. It is determined only by the detector housing geometry. To achieve a better accordance between the simulation and experimental results, the light collection non-uniformity of counters was modeled. For this purpose, the results of CORSIKA simulation were used to keep a good fit with the real spectrum of particles. To account the influence of the building roof over the MH, the value of particle energy threshold of 100 MeV was chosen. According to the experimental data, zenith angle was simulated in range of 0° - 15°. Using the simulation results, the matrices of the mean charge of the counter response to the passage of a single charged particle were obtained. The simulated light collection non-uniformity (18.2%) is close to the experimental value.

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