Propagation of the three-dimensional crystallization front in strongly coupled dusty plasma was investigated both experimentally and theoretically. The data obtained using the PK-3 Plus laboratory onboard the International Space Station were analyzed [1]. We propose the “axis” algorithm of solidlike particles identification, which makes it possible to isolate different domains and their surfaces as well. Determination of the three-dimensional front velocity is based on its definition implying that there exists a small area of the domain surface propagating along some line perpendicularly to it. We demonstrate that the front velocity is almost independent of time and amounts to ca. 60 µm s$^{-1}$ [2]. The theory of crystallization front propagation in a dust cloud is proposed, which is based on the assumption that the flux of crystallizing particles is proportional to the difference of self-diffusion coefficients for the liquid and solid phase. The equation typical for the nucleation theory for the front propagation velocity is obtained, $v = D_\ell \left[1 - e^{(1-S)\Delta}\right]/l$, where $D_\ell$ is the self-diffusion coefficient for the dust particle in a liquid, $l$ is the interface thickness, the quantity $S = \Gamma/\Gamma_0$, where $\Gamma$ and $\Gamma_0$ are the Coulomb coupling parameter and its bimodal value, respectively, plays the role of the supersaturation ratio in the nucleation theory, and $\Delta$ is a characteristic of the hop activation energy difference for the particles in the liquid and solid phases. We derive the upper bound for the front velocity that correlates with the results of experimental data processing.

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