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# A possible mechanism of space stem precursors formation at the negative lightning leader corona streamer burst periphery

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It's a common knowledge for the spark discharge researches that there are space leaders inside the negative leader streamer zone. They arise from plasma formations of the volume of about 1 $cm^3$ which are called space stems. But there is no any established idea about how space stems form in conditions when the background electric field magnitude inside a negative leader corona is about three times less than the dielectric strength of air. In this study, we propose a new mechanism of space stem precursors (ionization centers, which are capable to generate positive streamers) formation which is based on the joint action of ionization and drifting processes. The most possible location of proposed mechanism realization is the external boundary of the negative corona streamer burst, where electric field strength reaches a maximum value. The process takes place in the presence of strongly inhomogeneous stochastic electric field relief, which is formed by chaotically positioned clusters of negative charge transported to the negative corona streamer burst periphery by the negative streamer heads. The last are emanated from the leader tip during the negative corona streamer burst finishing each step-formation process. The only thing needed for the space stem precursor formation is the increased level of streamer heads spatiotemporal appearance frequency inside the very small area of space, which scale is of the order of a few millimeters. One important conclusion derived from this study is that the relatively strong electric field strength, overabundance of negative charge, and increased level of both reduced electric field and detachment frequency, which accompany ionization center formation, facilitate survival and growth of positive streamers initiated from a space stem precursor. The model is applied to specify the range of conditions, under which space stem precursor genesis is possible, and to analyze times of its formation at the range of altitudes of 0-12 km.

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