

M27a Solar micro-Type III burst storms and long dipolar magnetic field in the outer corona

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Solar micro-type III radio bursts are elements of the so-called type III storms and are characterized by short-lived, continuous, and weak emissions. Their frequency of occurrence with respect to radiation power is quite different from that of ordinary type III bursts, suggesting that the generation process is not flare-related but due to some recurrent acceleration processes around the active region. We examine the relationship of micro-type III radio bursts with coronal streamers. We also explore the propagation channel of bursts in the outer corona, the acceleration process, and the escape route of electron beams. It is observationally confirmed that micro-type III bursts occur near the edge of coronal streamers. The magnetic field line of the escaping electron beams is tracked on the basis of the frequency drift rate of micro-type III bursts and the electron density distribution model. The results demonstrate that electron beams are trapped along closed dipolar field lines in the outer coronal region, which arise from the interface region between the active region and the coronal hole. A 22-year statistical study reveals that the apex altitude of the magnetic loop ranges from 15 to 50 RS. The distribution of the apex altitude has a sharp upper limit around 50 RS suggesting that an unknown but universal condition regulates the upper boundary of the streamer dipolar field.