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Generation of plasma waves at the upper-hybrid frequency during the early stage of a flare process in solar active region

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The main reason of current interest to the problem of the upper-hybrid plasma wave generation in the loop structures is well known fact that UH-wave in the process of three-wave interaction can produce the ordinary electromagnetic wave. This last one can, in principle, reach a remote observer. We investigated the physical conditions of UH-wave's generation during the linear stage of development of the corresponding instability in the arc structures in solar active region before a flare. It was assumed that the main reason of the mentioned instability is the summary action of the pair Coulomb collisions and quasi-static large-scale electric field in the current circuit of a loop. The adiabatically slow growth of this field's amplitude is the result of increase of intensity of interaction of the magnetic fluxes in the framework of the theory of Heyvaerts-Priest-Rust. The generated wave is very close to the first harmonics of the pure electron Bernstein modes, which is modified by the collisions and "subdreicer" electric field. It is shown, that this wave can appear at the chromospheric and "subphotospheric" parts of the current circuit of a loop only at the early stage of the interaction of the fluxes, when the ion-electron collisions dominate in plasma. At more late stage of a flare process, when anomalous resistance appears due to the development of the second harmonics instability and rise of a turbulence, the instability of the first harmonics is absent.