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Can the fine structure of type II solar radio bursts at decametric and hectometric waves be the consequence of propagation effects in the solar corona?

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Dynamic spectra obtained with WIND/WAVES and STEREO/SWAVES instruments show that type II solar radio bursts at decametric and longer waves quite often reveal fine structure in the form of narrow-band fibers. The analysis of observational data has made it possible to draw a conclusion (Chernov et al., Solar Phys. 241, 145, 2007) that the fiber structure is formed when the shock wave generating the burst is catching up with a coronal mass ejection (CME) and passing through narrow jets in the wake of the CME. However, the fibers observed display variety in their characteristics, which may be related to different generation mechanisms. As one of possible generation mechanisms, we consider in this paper a mechanism based on propagation effects of radio emission in the corona. The narrow-band fibers, from this point of view, represent traces of focusings of radio emission propagating through the inhomogeneous structure of the CME. The jets with increased electron density play an important role in the mechanism under consideration. In the paper, we have carried out Monte Carlo simulations of radio emission propagation in such a structured corona. We take into account regular refraction of radio waves on the jets and inhomogeneous structure of the CME as well as scattering by the spectrum of chaotic inhomogeneities. The possibilities for identification of the fibers caused by this mechanism, based on SWAVES data are discussed.