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Alfven ship waves: emission of ULF waves by substorm injected particles

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The generation of Alfven wave by substorm injected energetic particles in the magnetosphere is studied. In distinction to traditional generation mechanisms, when the wave is excited due to the resonant wave-particle interaction (drift-bounce instability), in our mechanism the wave is emitted by the variable current created by the drifting particle cloud. The wave is shown to appear in the point with the given azimuthal coordinate just after the cloud of energetic particles has passed this point. The azimuthally drifting cloud of particles generates a wave with clearly determined negative value of azimuthal wave number: $m \sim -\omega/\Omega$, where ω is the eigenfrequency of standing Alfven wave, and Ω is the particle drift frequency. The amplitude of the generated wave is close to the observed poloidal ULF waves amplitude at the reasonable suppositions about the density of the energetic particles.