

Chemical physics of D and E layers of the ionosphere

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Abstract

The main chemical reactions that lead to formation of the nonequilibrium two-temperature plasma and highly excited Rydberg complexes are considered. A special attention is given to *l*-mixing reaction responsible for the formation of quantum resonance properties for radio wave propagation medium. A detailed analysis of the influence of Rydberg states to the behavior of GPS signals in D and E layers of the ionosphere is presented. It is shown that the transition frequencies between the excited states of orbitally degenerate Rydberg complex are resonant with respect to the carrier frequencies of GPS. That is why these states are the main cause of the GPS signal distortion. The mechanism of GPS signal delay in D and E layers is also discussed.

Keywords

D and E layers of the ionosphere, Chemical reactions, Rydberg complexes

Additional UHF and IR radiation