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On the center-to-limb variation of radio brightness at millimeter wavelengths

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In this work we use realistic three-dimensional (3D) radiative-MHD simulations of the chromosphere to model distribution of radio brightness over the solar disk and radio radius at millimeter wavelengths. We compare modeled center-to-limb variations with the observed behavior derived from diverse historical measurements as well as from recent observations. Our results show that the model distribution of millimeter brightness resembles the observed dependencies up to the distance of $0.95R$. We report the model value of the radio radius (excess over the optical radius) to be in the range of 3-4 arcsec for the entire millimeter range, which is significantly smaller than the observed values (5-12 arcsec). The possible reasons of the found discrepancy between the models and observations in the near-limb zone are discussed.

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