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Theoretical relations between the plasma parameters and Metis observables for eruptive prominences and CMEs

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The Metis coronagraph simultaneously detects the integrated intensity of the hydrogen Lyman α line and the continuum intensity of the visible light, over the entire field of view. We focus on 2D non-LTE modeling of eruptive prominences or cores of CMEs up to eight solar radii, using a range of flow velocities to account for the Doppler dimming effect. We consider isothermal and isobaric 2D non-LTE models and show various relations between plasma physical parameters and radiation outputs. We discuss the relative role of the radiative and collisional excitation of Lyman α and also show the importance of hydrogen photoionization and collisional ionization. The full non-LTE treatment allows us to consider models with a range of optical thicknesses in the Lyman α line and we thus can demonstrate the importance of the opacity effects. Our results based on an extended grid of models will be helpful for interpreting the Metis observations.

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