Modeling large scale coronal structures with advanced models

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To understand physical process in the solar corona (e.g. coronal mass ejections), it is important to get insights regarding the 3D-structure of the coronal plasma and magnetic field. Unfortunately a direct measurement of the coronal magnetic field and 3D plasma density distribution is extreme difficult, if not impossible. Current measurements provide us the photospheric magnetic field (e.g. MDI on SOHO) and line of sight integrated 2D coronal images (e.g. EIT, LASCO, white light coronagraph images). We use these observations to reconstruct the 3D-structure of the solar corona. Historically, large scale coronal structures have been modeled with potential field models . Now we construct these large structures with more advanced MHD models. From these models, artificial coronal images are produced and compared with visible and EUV coronagraph observations. This help us to rate and improve the quality of the model. Scaling laws which relate loop emissivities with plasma parameters will be tested with these models. The distribution of the plasma and the shape of the loops in these models compared to what is seen in the images will reveal how well the magnetic field is reconstructed. We discuss how future measurements from different viewpoint with STEREO can be used to refine the model.