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The roles of IMF By, dipole tilt, and conductance differences in establishing nonconjugate auroral features

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Over the last few years, the analysis of a set of simultaneous auroral observations has led to the recognition that auroral features can differ considerably between the hemispheres. This heretofore underappreciated difference has spawned new research into the causes behind these asymmetries. Candidates for contributing factors to the presence or absence of auroral conjugacy include precipitation asymmetries in case of the diffuse aurora, inter-hemispherical conductivity differences, magnetospheric asymmetries brought about by, e.g., dipole tilt, corotation, or IMF By, and, finally, asymmetries in field-aligned current generation primarily in the nightside magnetosphere. In this presentation, we will analyze high-resolution, global MHD simulations of magnetospheric dynamics, with emphasis on auroral conjugacy. For the purpose of this study, we define controlled conditions by selecting solstice times with steady solar wind input, the latter of which includes an IMF rotation from purely southward to east-westward, and we focus on the roles of dipole tilt, IMF By, and of conductivity differences. We will study in detail four high-resolution, global MHD, simulation runs, which are designed to isolate the role of these parameters.