M27a Comparison on Ca II 8542Å synthetic Stokes profile between magnetic reconnection and shock wave in simulated Solar chromosphere

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Magnetic reconnection is responsible for many solar chromospheric phenomena, such as anemone jets and UV bursts. It is quite important to discriminate reconnection events from ubiquitous shock waves in observation signal. We studied the Ca II 8542Å synthetic Stokes profiles of 2D realistic radiative MHD simulation and compared the difference between reconnection and shock events. Emerging magnetic flux was imposed at the bottom boundary (2 Mm below the photosphere) of well-relaxed unipolar atmosphere, leading to chromospheric reconnection events with outflows with a speed of ∼30km/s. We performed Stokes synthesis by RH code around 8542Å, Gaussian sampled with 50mÅ spacing to compare with future observation of DKIST ViSP. We found that reconnections and shocks share many similar Stokes features, i.e., brightening and high velocity Doppler shift on Stokes I, and sign reversal on Stokes V. The main differences are the timescale and spatial scale: ∼300s and ∼0.5Mm for reconnections; ∼100s and ∼2Mm for shocks. Also, the sign reversal of Stokes-V for shocks usually contains a transitional zone, but for reconnections the signal suddenly reverses around the X-point. Therefore, we conclude that the timescale and spatial scale, together with other differences, could be indicators to discriminate reconnections from shocks in observation.