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Understanding the Flaring Solar Chromosphere

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Solar flares are transient yet dramatic energy release events occurring in the solar atmosphere, representing extreme examples of various plasma physics phenomenon. They are also major drivers of space weather. Here I focus on the response of the solar chromosphere to flare energy injection. The chromosphere is the primary energy deposition site, and consequently the origin of the bulk the flare's radiated energy. Confronting state-of-the-art models of the chromosphere's response with observations is key if we wish to interrogate our understanding of flare energy transport mechanisms. I will describe how we can use state-of-the-art field-aligned radiation hydrodynamics flare simulations to forward model chromospheric radiation, and how we can use those simulations to both help interpret observations, and to challenge our theories. I will focus on two specific observables that have the potential to pose strong constraints on flare energy transport models: the white light continuum, and the He I 10830 line. Both of these observations present subtle yet powerful diagnostics of the flaring plasma.