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3D non-LTE radiative transfer in the solar atmosphere

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Predictions made by radiation-MHD simulations of the solar atmosphere can be tested by comparing the emergent spectrum to observations. Comparison with observations of the intensity in spectral lines that form in the chromosphere require that non-LTE, non-equilibrium, 3D effects, and partially coherent scattering play important roles. If comparison with the full Stokes vector is required, then also atomic polarization, as well as the Zeeman and Hanle effect need to be considered.
I will present results obtained with the Multi3d radiative transfer code as applied to simulations with Bifrost and Muram that take some of these effects into account. If time permits I will also discuss multigrid methods that can be used to speed up the calculations, and argue for the need of including adaptive mesh refinement in the future.

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