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2.5-dimensional MHD simulation of coronal rain

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With the MPI-AMRVAC code, we present a 2.5-dimensional magnetohydrodynamic (MHD) simulation, which includes thermal convection and radiative cooling, to investigate the initial formation and long-term sustainment of coronal rain phenomenon. We perform the simulation in the initially linear force-free arcades which host a chromospheric, transition region, and coronal plasma, with turbulent heating localized on their footpoints after a relaxation to quiet solar atmosphere. Due to thermal instability, condensation starts at the loop top and becomes fragmented into smaller blobs. Following coronal rain dynamics for over 9 hours of physical time, we carry out a statistic study of the coronal rain blobs which quantify their widths, lengths, velocity distributions and other characteristics. We also track the movement of single blobs to study their dynamics and physical mechanisms behind them.

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