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# Direct 3D reduced MHD simulations of coronal heating in magnetized loops: a realization of the Parker scenario

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We present direct 3D reduced magnetohydrodynamic (MHD) simulations modeling the heating of coronal loops in the solar atmosphere via the tangling of coronal field lines by photospheric footpoint motions. We carry out long-time 3D simulations with both the highest resolution and the longest time extent to date. We reach resolutions sufficient to derive scaling properties with Reynolds numbers, loop length, and ratio of photospheric velocity to coronal Alfvén speeds. In particular, it is shown that the heating rate is independent of the Reynolds number thanks to the development of a turbulent dynamics, and that it scales as the square of the strength of the dominant axial magnetic field. The dynamics in physical space is driven by the reconnection of induced coronal magnetic fields, that leads to the formation of current sheets elongated along the axial direction, where the bulk coronal heating takes place. Line-tying of the axial field lines plays a significant role by inhibiting coalescence and inverse cascades in the loop cross-sections, which dominate dynamics in 2D models.