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In-Situ Switchback Formation in the Expanding Solar Wind¹ JONATHAN SQUIRE, University of Otago, BENJAMIN CHANDRAN, University of New Hampshire, ROMAIN MEYRAND, University of Otago — Recent nearsun solar-wind observations from Parker Solar Probe have found a highly dynamic magnetic environment, permeated by abrupt radial-field reversals, or "switchbacks." We show that many features of the observed turbulence are reproduced by a spectrum of Alfvénic fluctuations advected by a radially expanding flow. Starting from simple superpositions of low-amplitude outward-propagating waves, our expanding-box compressible MHD simulations naturally develop switchbacks because (i) the normalized amplitude of waves grows due to expansion and (ii) fluctuations evolve towards spherical polarization (i.e., nearly constant field strength). These results suggest that switchbacks form in-situ in the expanding solar wind and are not indicative of impulsive processes in the chromosphere or corona.

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