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Perpendicular Ion Heating by Low-Frequency Alfvenic Turbulence in the Solar Wind BENJAMIN CHANDRAN, University of New Hampshire, BO LI, BARRETT ROGERS, Dartmouth College, ELIOT QUATAERT, University of California, Berkeley, KAI GERMASCHEWSKI, University of New Hampshire — A critical unsolved problem in the study of solar wind turbulence is to determine whether low-frequency Alfven-wave (AW) and kinetic-Alfven-wave (KAW) turbulence can explain the perpendicular ion heating that is observed in coronal holes and low-beta fast-wind streams. In linear wave theory, low-frequency AWs and KAWs are incapable of causing perpendicular ion heating. On the other hand, a number of observations suggest that low-frequency AW/KAW turbulence is the primary heating mechanism in the solar wind. This poster describes recent work that offers a possible solution to this long-standing problem, and which extends previous studies of "stochastic heating." An analytic expression for the stochastic heating rate in low-beta plasmas is derived and tested against simulations of test particles interacting with a spectrum of randomly phased AWs and KAWs. This expression is then used in conjunction with an observationally constrained model of solar-wind turbulence to obtain ion temperature profiles, which agree well with observations from the Ultraviolet Coronagraph Spectrometer.

Benjamin Chandran
University of New Hampshire

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