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A Newly Discovered Source of Turbulence in the Solar Chromosphere[1] YAKOV DIMANT, MEERS OPPENHEIM, WILLIAM LONGLEY, Boston University — Above the Sun's luminous photosphere lies the solar chromosphere where the temperature increases from below 4000 K to over 1 million K. Though solar researchers do not understand the origin of these increases, they know it powers the solar wind with enormous consequences for the solar system. This talk describes an analytical theory and a set of massively parallel simulations showing that conditions in the coolest parts of the solar chromosphere. The conditions there have some similarities with the lower Earth's ionosphere where plasma collisions with neutral atmosphere play a crucial role. Our simulsations have shown that neutral motions in the chromosphere may easily drive a previously unidentified thermal plasma instability that rapidly develops into turbulence. This meter-scale turbulence will modify the conductivity, temperatures, and energy flows through the chromosphere. Additionally, it provides a mechanism to convert energy from neutral flows into plasma turbulence and electron heating. This research demonstrates the importance of small-scale plasma wave physics on the larger scale solar atmosphere.

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