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Self Organization in the Solar Corona and Interstellar Medium<sup>1</sup> STEVEN SPANGLER, University of Iowa — Self-organization can be defined as the process by which a physical system, in the course of its evolution, changes its spatial structure, the form of its equations of motions, or key coefficients in those equations. Paradigmatic examples are chemical reactions of the reaction-diffusion type, and biological systems. I discuss astrophysical processes where similar sorts of dynamics may be occurring. The first example is Joule heating of the solar corona. A major problem in astrophysics is the physical mechanism or mechanisms responsible for heating the solar corona to 1-2 million K. Coronal heating by turbulent current sheets is negligible if a standard expression for the resistivity of a plasma is used, but as the current sheets evolve, they develop progressively higher current densities. These high current densities can enhance the resistivity via plasma instabilities, and make Joule heating a more effective process. The second example is from the interstellar medium. The formation of massive stars leads to processes which compress the nearby interstellar medium, making star formation a more efficient process. Similarities and differences with better studied systems exhibiting self organization will be discussed.

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Steven Spangler University of Iowa

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