

Auroral complexity

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Fluctuations in the earth's aurora occur across a wide range of temporal and spatial scales. Over the years, certain auroral patterns have been given names (curls, spirals, substorm bulge, etc) and associated with characteristic scales. However, recently, attention has begun to focus on whether there may be universal aspects of auroral structure, of the type observed in many complex natural systems. For example, it has been observed that general fluctuations in auroral current and brightness above an arbitrary fixed threshold are self-similar across a wide range of scales. Self-similarity is a hallmark of a complex system - a system of many interacting parts - in which the correlation length extends up to the system scale such that coherent collective events may be of arbitrary size. Here we ask whether such universality may extend to the aurora of other planets and consider how this may be helpful in our understanding of them.