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**The Debate on Nonthermal Effects of Electromagnetic Fields:
Incommensurable Paradigms?**

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ABSTRACT

The debate over nonthermal effects of nonionizing radiation that has developed over the past 50 years seems to fit Thomas Kuhn’s model of incommensurable paradigms. Kuhn used the notion of incommensurability to characterize the differences between successive “paradigms” or explanatory frameworks in the history of science and the “mutual incomprehension” between adherents of different paradigms of scientific thought. EMF bioeffects research illustrates Kuhn’s claim that anomalous results that cannot be accommodated by an existing explanatory framework lead to debate and contention.

However, the EMF case complicates Kuhn’s picture in two ways. First, it concerns not only change over time but also the intellectual dynamics of interdisciplinary inquiry: different frameworks in this case derive not only from the differential acceptance of a newly proposed explanatory framework within a single scientific community but also from different long-standing and deeply engrained commitments and styles of thinking in separate disciplines. Second, it concerns socio-political interests that transcend the scientific community: economic, health, and policy interests exert their influences in the public realm, and the debate thus involves them as well as public positioning of the relevant disciplinary communities.

This presentation characterizes these intellectual and socio-political dimensions of the EMF debate by examining argumentative strategies. First, the intellectual commitments and styles of the major disciplines contributing to the debate, the biological sciences and the physical sciences, are contrasted through an analysis of the preferred argumentative appeals used to explain novel, or anomalous, results. Second, the arguments are examined as an asymmetric debate between heretical challengers and defenders of an orthodoxy. Defense strategies common to such situations are found in this case: correction, boundary-work, ridicule, and scapegoating.

This analysis suggests that incommensurability is not a productive way to characterize differences between disciplinary commitments. As a mathematical concept, incommensurability emphasizes the logical relationships among concepts. It is more explanatory to understand scientific debate as the result of both intellectual and socio-political dynamics. The intellectual dynamic plays out as a tension between novelty and tradition, and the socio-political dynamic plays out as a tension between heresy and orthodoxy. It is possible that consciousness of these dynamics might produce better interdisciplinary cooperation and better public policy-making.