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The Role of Experiment in Our Understanding of Critical Phenomena

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Progress in physics usually is maximized when there is close contact between experimentalists and theorists. This talk will review some of the interactions between experiment and theory that have occurred in the field of critical phenomena since the discovery of the critical point by Andrews in 1869. These interactions appear to have been very fruitful in the 19th century, but seem to have been lacking to some extent during the first half of the 20th century. In more recent times experimental results again have had a more profound influence, but with the advent of the renormalization-group theory they mostly served the important purpose of confirming theoretical predictions. In the present century the emphasis of theory has largely moved on to other fields because the problem of critical phenomena is considered by many to be “solved”; but some experimentalists are still exploring new frontiers at the boundary between critical phenomena and other areas of condensed-matter physics that hopefully will re-attract the attention of the theoretical community.