

APR14-2014-000220

Abstract for an Invited Paper
for the APR14 Meeting of
the American Physical Society

Galileo as an intellectual heretic and why that matters

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What was physics like before Galileo? Five centuries ago physics was taught in universities all over Europe as part of a broader field of knowledge known as natural philosophy. It was neither quantitative, nor experimental, but mostly an a-priori, logical type of inquiry about principles concerning notions such as space, time, and motion, from which deductions could be made about the natural world. Galileo changed all that. He claimed that inquiry about nature should be experimental, and that reasoning in natural philosophy should be mathematical. It was a bold enough move. But Galileo's intellectual heresy was the discovery that knowledge of the natural world could only be achieved by relaxing the requirement that principles be known with absolute certainty. He demonstrated that a new mathematical physics could be built upon principles based on experiment. Thus the new physics could be extended recklessly by starting from less than certain foundations. Galileo's startling insight was that scientific truth need not be localized but can be diffused throughout the structure of science.