

# **Between Absolute and Relative, Life and Death, Causality and Probability: The Cultural History of Mechanics**

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Abstract:

From the 1860s when the University of Göttingen offered a prize for the first critical history of mechanics through to the 1930s when Boris Hessen delivered his famous account of the social and economic context for Newton's work, the character and status of mechanics was the subject of vigorous but sporadic discussion both within and beyond the physics community. Yet despite significant concern with a small number of episodes, we have little appreciation of the full extent and cross-disciplinary dynamics of the debates surrounding the subject. Building on the earlier work of Forman, Heilbron, Stöltzner, and Martinez, this paper will examine the contributions of figures such as Eugen Dühring, Friedrich Engels, Ernst Mach, Karl Pearson, Henri Poincaré, Vladimir Lenin, Walther Rathenau, Max Weber, Oswald Spengler, and Boris Hessen, in order to argue that a number of long-standing thematic concerns structured discourse on mechanics throughout this period. It will contend that collectively, a widespread concern with a series of dichotomies – between absolute and relative, life and death, and causality and probability – engaged physics equally with neighboring disciplines and broader social thought, with sociology and with socialism. Assuming distinctively different valences at different times, debate on these dichotomies shaped both the philosophical and historiographical framework within which mechanics was understood, in ways that have not yet been fully appreciated. While my major aim is to sketch the contours of a terrain that has eluded more narrowly focused studies, I hope to provide further insight into the context in which figures like Bohr and Schrödinger developed their widely influential views of the nature and implications of quantum theory.