

Introduction

Measure for Measure

Measurement is among the most fundamental concepts, tracing back to the question of what exists and what is knowable about the world. Every era searches for the hidden assumptions of the world around us. Underlying the state of the measurement problem a chorus is heard behind the many conflicting voices, beginning with the Greeks of the

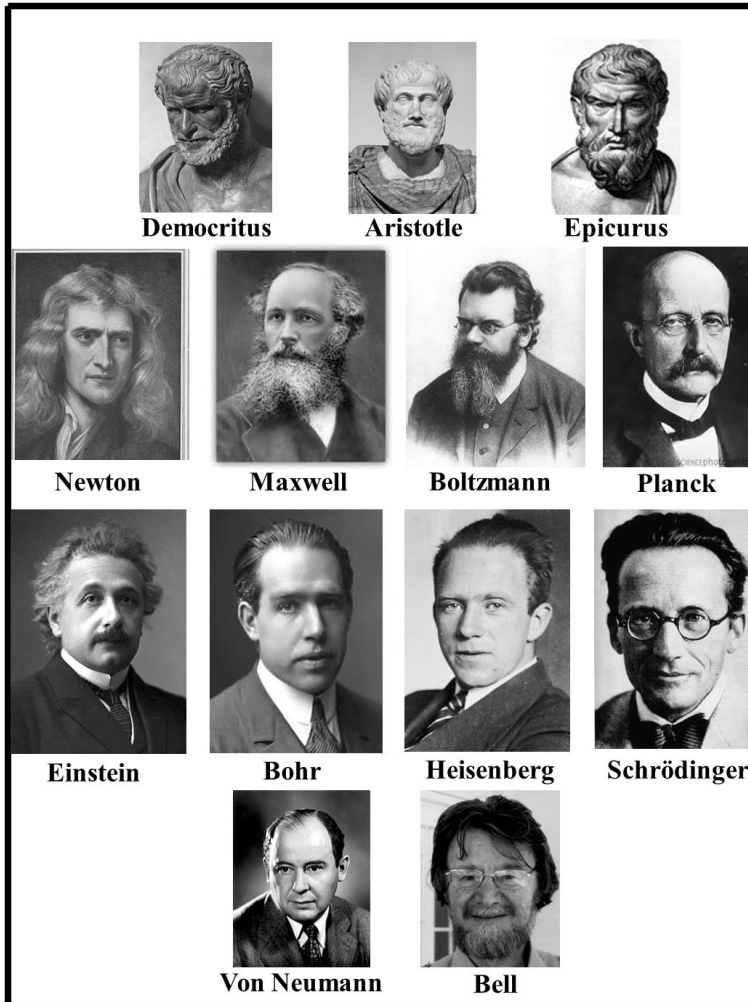


Figure 5.1: Scientists Significant in the History of the Measurement Problem.

AIP Emilio Segrè Visual Archives: James Clerk Maxwell; Max Planck; Niels Bohr (Photograph by A. B. Lagrelus and Westphal, W.F. Meggers Gallery of Nobel Laureates Collection); Erwin Schrödinger (Brittle Books Collection); John Bell (Photograph by Kurt Gottfried)

5th and 6th centuries BCE and through to the scientific revolutions of the 16th and 17th centuries and coming together as the 20th century witnessed the formulations and interpretations of quantum physics. Democritus and Aristotle, Newton and Maxwell, Einstein and Bohr, Heisenberg and Schrödinger, these among many others are all here today in the minds of working scientists, in a sense still protecting their ideas and saving them from oblivion as they continue to be debated and interpreted just as when they were first being developed and refined. There has been an urgent need in the first decades of the 21st century to finally come to grips with the quantum measurement problem in a way that conceptually and quantitatively describes the many attributes required to understand our physical existence. Scientists significant in the history of these ideas are shown in [Figure 5.1](#). The history of their ideas is an essential part of our journey.