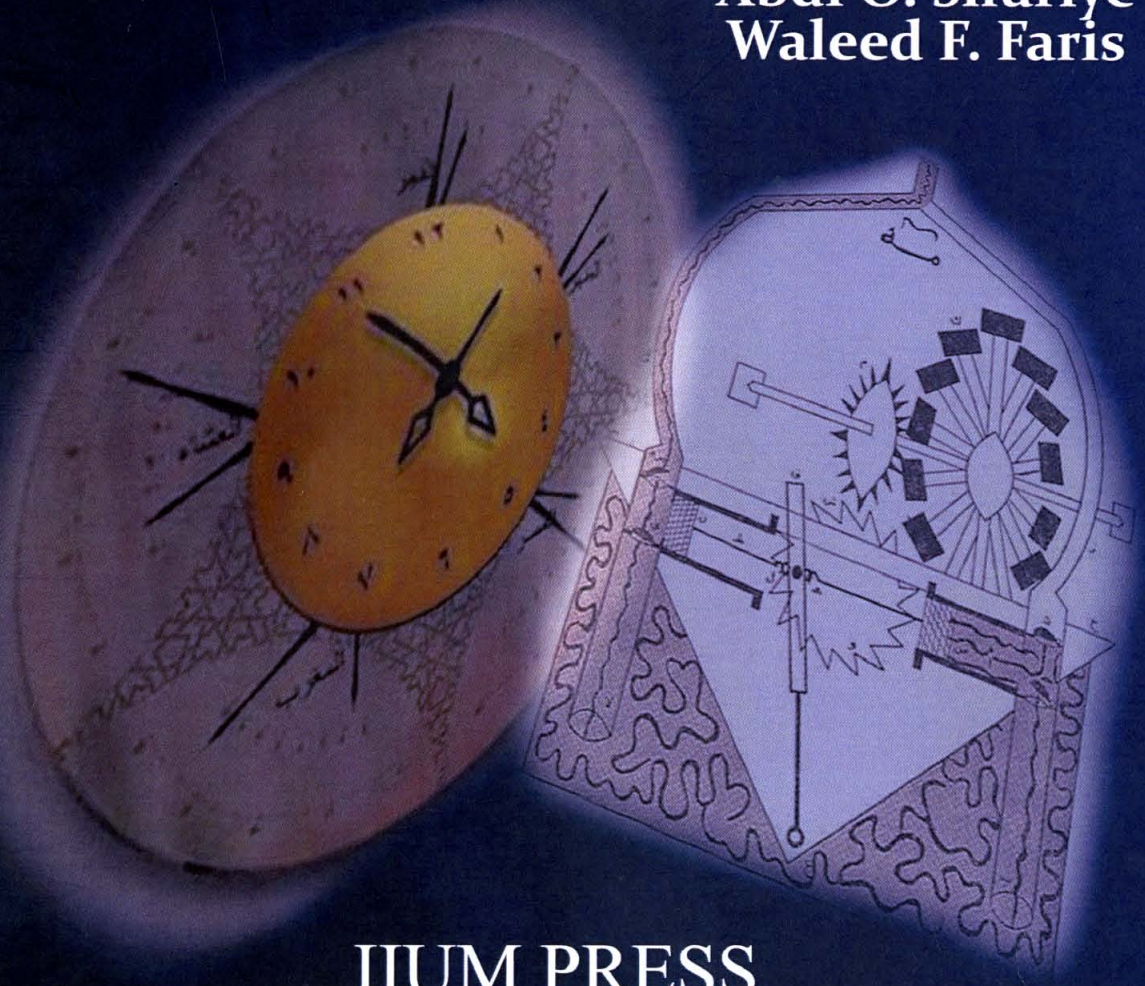
# Contributions of Early Muslim Scientists to Engineering Studies and Related Sciences

Abdi O. Shuriye
Waleed F. Faris



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# CHAPTER SEVENTEEN

# MAHMOUD HESSABY'S CONTRIBUTION TO THE INFINITELY EXTENDED PARTICLES THEORY IN QUANTUM PHYSICS

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## 17.1 INTRODUCTION

This chapter aims to highlight quantum physics and its major theories such as the infinitely extended particles. In fact, Classical mechanics functions very well for large objects that are moving much slower than the velocity of light. Nonetheless, once objects start to move very fast, we need to modify Newton's equations by relativistic equations. On the contrary, quantum theory becomes a necessity for objects that are extremely small. In this study, the importance of quantum theory will be investigated and explored. If Newton's laws were to be extended to domains that are far from daily experience, they will start to fail and give incorrect results. Historically, at the turn of the nineteenth century, the failure of Newtonian physics became very clear in the studies of the Atom (M. Hessaby, 1966).

However the question remains: What experimental evidence do we possess that Classical physics is invalid and that Quantum Theory, at present, is the most accurate explanation of how nature behaves. Classical physics is what intuitively follows from our five senses, and we have no purpose to naively extend the world apprehended by our five senses to microscopic domains of which we have no direct experience. The observations of radiation from a blackbody and its radiation (measured by spectroscopic lines) is the first experimental proof provided for Quantum Theory. Whenever one observes a neon or sodium light, one is observing Quantum theory in practice. Electronic devices such as computers, television, mobile phones etc., .are all based on the semiconductor. Furthermore, airplanes, ships and cars all employ semiconductors in an essential way. It is not an exaggeration to predict that 21$^{st}$ century technology will chiefly be based on the principles of Quantum physics. The chief emphasis of this chapter is to offer answers on Quantum physics in general and the infinitely extended particles theory (M. Hessaby, 1947) which was established by the Muslim Professor Mahmoud Hessaby (born in 1903 in Tarfresh, Iran and died in 1992).

## 17.2 QUANTUM THEORY

To this point, Quantum mechanics has been practically in complete agreement with experimental results. Its theoretical underpinning is not well-understood; as Bohr said, one of the founders of Quantum theory maintains those who are not shocked by Quantum