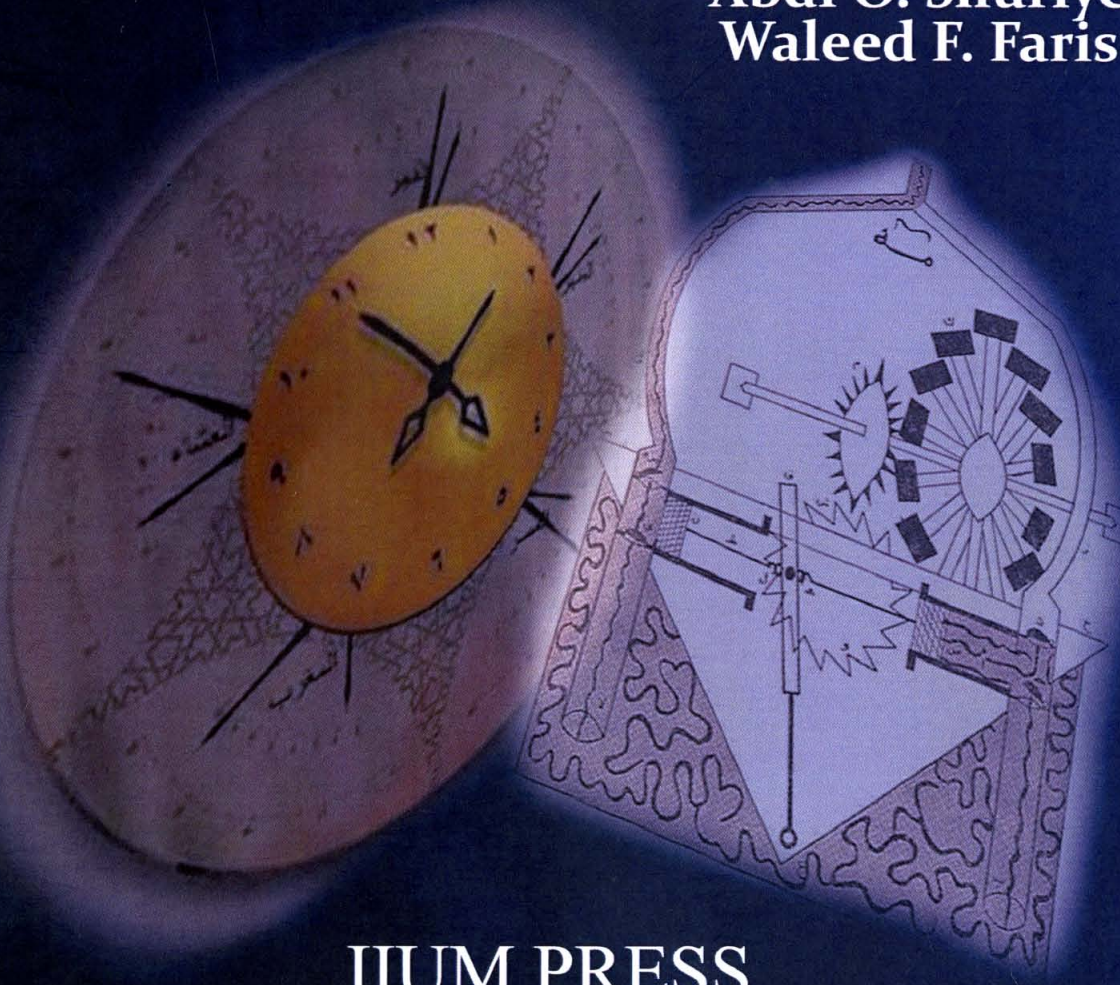


Contributions of Early Muslim Scientists to Engineering Studies and Related Sciences

Abdi O. Shuriye
Waleed F. Faris



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Editors

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CHAPTER THIRTY

THE INVENTION OF THE HELIUM-NEON GAS LASER BY ALI JAVAN

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30.1 INTRODUCTION

The chief aim of this chapter is to highlight one of the most important inventions of the 20th century which was created by the Iranian professor Ali Javan. This invention is the gas laser composed of Helium-Neon Laser. In this chapter the theory of the gas laser, its main components and advantages will be dealt with in comparison to the normal laser. The significance of the study lies in the fact that Ali Javan was one of the main inventors or more precisely a co-inventor of the gas laser. He has yet the distinction, however, for his principal contributions in the period preceding the laser, this period itself having its beginning with the original discovery of the well-known masers, the equivalent of the lasers operating at the microwave frequencies (A. Javan, 1961). As events had it in Javan own history, and shortly following within month's time of this original discovery.

Thus he is accredited for discovering a new class of maser effects that are applicable to a new class of the maser, functioning on strictly novel Quantum mechanical principles of special significance. And that which, as he has it again in his history, he extended the working principles of these new classes of masers operating at the microwave frequencies, into now the optical frequencies, at orders of magnitudes higher than at microwave. As it seemed so unexpectedly, his discovering of the working principle of his original well-known Helium Neon laser follows directly. And that as it proved relied in its working principle on the special quantum mechanical properties of the two inert gases, the Helium and Neon, in a gaseous discharge of a special design. This made it possible to convert, for the very first time, the electrical energy in gaseous discharges into a collimated, continuous wave laser light beam (A. Javan, 1961).

30.2 TYPES OF LASERS

Generally, lasers can be categorized with regards to the type of active medium, excitation mechanism, or duration of laser output. In this chapter classification by active medium is utilized.