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THE LONG WAY TO UNDERSTAND THE SOLAR SYSTEM, THE MEDIEVAL ISLAMIC GOLDEN
AGE CONTRIBUTION

Abstract

Three civilizations: Greece, Islamic Golden Age, and Renaissance, contributed to the understanding of the Solar System. The most accomplished model produced by ancient Greece was the geocentric model of Ptolemy, composed of moving embedded spherical orbs including a complex system of deferents, eccentrics, epicycles and equants. To meet a philosophical necessity stated by Aristotle, all movements had to be able to be reduced to a combination of perfect circles traveled at a uniform speed. Taking the position of the Sun as the only criterion, some have presented the contribution of astronomers of the Islamic Golden Age as a simple transfer of the Ptolemy model to Europe in the late Middle Ages. But the perspective changes completely if one distinguishes between "physical model" and "computational model". This modern notion had been understood by Ibn Rushd (Averroes) who would have written "The astronomy of our time offers no truth, it only agrees with calculations and not with what exists", and by al-Biruni. If we consider the contribution of the astronomers of the Islamic Golden Age as the improvement of the data acquisition and processing, especially when considering the variety and quality of the mathematical tools incorporated in the model. Nevertheless, considerations on the physics were not excluded. This paper proposes a brief description of these contributions by putting it in relation with the historical context such as the origin of the polymaths, their means of existence, and the philosophical trends of their times, according to the following breakdown: The very beginnings, the era of Persian scholars of the House of Wisdom, rapidly turning toward translations (+ comments, + amendments) of indian and greek original texts. Then, the apogee of the Golden Age (and blossoming into a formidable and varied production) occurred, and finally, maturity soon followed by the drying up of the original production. But as shown by the latinization of the names of the most famous polymaths of the arabic apogee time, knowledge of the tools they developed was transmitted to Western Europe, where intellectual activity had been experiencing a revival since the 13th century, thus strongly contributing to the understanding of the Solar System.