

# Cosmology of Maimonides: Examining the Differences in Greek and Islamic Thought

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## I. Introduction

Moses Maimonides (Moshe ben Maimon, Hebrew acronym: Rambam, 1135–1204), one of the greatest thinkers during the medieval period, had many roles in his life, such as a Rabbi, Jewish community leader, medical doctor, and philosophical scholar. He wrote many books in various fields: e.g., *Logics* (*Maqāla fī šinā‘at al-mantiq*) and *Treatise on the Calender* (*Ma’amar ha-‘ibbur*) (1157/1158), which are said to have been written while he was still in Andalus; his great legal masterpieces, *Commentary on Mishnar* (*Pirush ha-mishnayot*) (1161–1168) and *Mishneh Torah* (1168–77); letters and responsa, such as a *Letter to Yemen* (*Iggeret Teman*) (1172); and his most important philosophical work, *the Guide of the Perplexed* (Arabic: *Dalālat al-hā’irīn*, Hebrew: *Moreh nebukhim*, Latin: *Dux neutrorum*) written in Judeo-Arabic (hereafter referred to as the *Guide*). In the *Guide*, two-thirds of the chapters in the second part are devoted to his treatise on creation. Among them, from chapter three to chapter twelve, he discusses spheres and angels, and in chapter twenty-three and chapter twenty-four, he deals with technical discussions on astronomy. Today’s theme, cosmology, naturally deals with astronomy, but at the same time, includes astrology although Maimonides was totally against this; it also contains philosophical aspects of space and the universe. As I am not a scientist, I cannot handle a very technical discussion, so today, I will discuss Maimonides’ cosmological vision as a whole in order to reach the depths of his philosophical perspective.

## II. Maimonides’ Opinion on Astrology

Traditionally, Jewish people have accepted astrology by thinking that movements of stars and the spheres affect human society and individual human life. However, Maimonides absolutely rejected astrological ideas. Let me quote a passage from *Mishneh Torah*, Book of the Knowledge, on Idolatry, chapter 11: 8–9.

Who were the observers of the times? They were those who predicted by astrology that one

day was good or bad, one day suitable for some work and one year or month bad for something. It was forbidden to be an observer of times, even if no action was involved. Astrologers deceived fools who thought their utterances were true and wise. All who followed them and arranged work or travelling by the times of the stars were striped, as the verse says: ‘nor observe times’ (Lev. 19:26).<sup>1)</sup>

Other medieval Jewish thinkers, such as Abraham Bar Hiyya of Barcelona or Abraham Ibn Ezra had a rather more positive attitude toward astrology, although they tried to separate astrology from star worshipping and astrological magic in order to get away from extreme fatalism.<sup>2)</sup> Judah Halevi accepted astrology, but his view was not necessarily straightforward and clear. I will quote next passage from the *Kuzari*, . IV:9:

The Rabbi: We cannot deny that the heavenly spheres exercise influence on terrestrial matters. We must admit that the material components of growth and decay are dependent on the sphere, whilst the forms take their origin from Him who arranges and guides them, and makes them the instruments for the preservation of all the things which He wishes should exist. The particulars are unknown to us. The astrologer boasts of knowing them, but we reject it, and assert that no mortal can understand them. If we find that any element of this science is based on the divine law, we accept it. But even then we must rest satisfied with such astronomical proficiency as was possessed by the Sages,...<sup>3)</sup>

Even though Maimonides was respected as a great thinker among Jews, his opinion on astrology was not accepted by most Jewish people, although astrology and horoscopes were popular among other people living in the Mediterranean areas and Europe in Maimonides’ period.

### **III. Greek and Roman Views on Cosmology**

Astronomy had advanced greatly in Ancient Greece accompanied by the development of geometry by Pythagoras (c. 570 BC—c. 495 BC) and Eudoxos (c. 408 BC—c. 355 BC). Among the Greek mathematicians, Hipparchos (c. 190 BC—c. 120 BC) made significant achievements in the field of astronomy. A compilation of Greek astronomy was made by Ptolemy (c. AD 90—c. AD 168) in his book, *Almagest*, which was the most influential book on astronomy until Copernicus established his sun-centered, heliocentric model of the planets. Here, I will introduce you to the Ptolemaic, earth-centered planetary model through Cicero’s work. Cicero (106 BC—43 BC) was a Roman

philosopher, statesman, lawyer, and one of the greatest thinkers in Roman history. He studied philosophy in Athens through Antiochus of Ascalon, a Palestinian Academic philosopher. I will quote a passage from *Scipio's Dream*, chapter 4. [See, Figure 1.]

The whole universe is comprised of nine circles, or rather spheres. The outermost of these is the celestial sphere, embracing all the rest, itself the supreme god, confining and containing all the other spheres. In it are fixed the eternally revolving movements of the stars. Beneath it are the seven underlying spheres, which revolve in an opposite direction to that of the celestial sphere. One of these spheres belongs to that planet which on earth is called Saturn. Below it is that brilliant orb, propitious and helpful to the human race, called Jupiter. Next comes the ruddy one, which you call Mars, dreaded on earth. Next, and occupying almost the middle region, comes the sun, leader, chief, and regulator of the other lights, mind and moderator of the universe, of such magnitude that it fills all with its radiance. The sun's companions, so to speak, each in its own sphere, follow—the one Venus, the other Mercury—and in the lowest sphere the moon, kindled by the rays of the sun, revolves. Below the moon all is mortal and transitory, with the exception of the souls bestowed upon the human race by the benevolence of the gods. Above the moon all things are eternal. Now in the center, the ninth of the spheres, is the earth, never moving and at the bottom. Towards it all bodies gravitate by their own inclination.<sup>4)</sup>

Evidently, a very typical Ptolemaic idea can be found through this citation from Cicero. Ptolemy, however, also wrote astrological books, *Tetrabiblos*, which have been influential among astrologers up to the present day. In fact, at the time of Ptolemy in the first century, astrology was as popular in the Roman Empire, as it was at the time of Maimonides in the twelfth century.

#### **IV. Astronomy in the Medieval Period**

In the medieval period, the leading astronomical works came from the Islamic world. Greek scientific works, such as *Almagest*, were translated into Arabic through Syriac translations from the ninth to the thirteenth centuries. There were two astronomical observatories in the Islamic world, one was in Baghdad, and the other was in Damascus. Jews translated Greek scientific works into Hebrew through Arabic translations in the twelfth century. Moreover, Jews translated these works into Latin, and by doing so, they contributed to bridging the gap between the Arabic world and the Latin world in the scientific field.<sup>5)</sup> Maimonides summarised medieval philosophical views on cosmology in the *Guide* II:4 as follows. [See, Figure 2.]

With regard to the opinion of the later philosophers that there are ten separate intellects,... The globes are nine according to their reckoning; namely, the one that encompasses the universe, the sphere of the fixed stars, and the spheres of the seven planets. The tenth intellect is the Active Intellect, whose existence is indicated by the facts that our intellects pass from potentiality to actuality and that the forms of the existents that are subject to generation and corruption are actualized after they have been in their matter only in potentia...it follows necessarily that the deity, may He be exalted, has—according to him [Aristotle]—brought into existence the first intellect, who is the mover of the first sphere in the way that we have explained. Again the intellect that causes the second sphere to move has as its cause and principle the first intellect, and so on, so that the intellect that causes the sphere that is contiguous with us to move is the cause and principle of the Active Intellect. ...All his disquisition may be summed up as follows: All spheres are living bodies, endowed with a soul and an intellect, having a mental representation and an apprehension of the deity and also a mental representation of their own first principles. In that which exists, there are separate intellects that are in no way a body. All of them overflow from God, may He be exalted, and they are the intermediaries between God and all these bodies.<sup>6)</sup>

In figure 2 can be found the same description as explained in this quotation. As you may notice, figure 2 does not show exactly what Aristotle says, as Maimonides mentions, but rather that his view was very much influenced by Neoplatonists. I will examine this point in the following sections.

## **V. Aristotle's Treatise on the Motion of the Spheres**

In Aristotle's *Metaphysics*, he gives his basic ideas on physics, namely, his description of how the spheres move.

Now since that which is moved must be moved by something, and the prime mover must be essentially immovable, and eternal motion must be excited by something eternal, and one motion by some one thing; and since we can see that besides the simple spatial motion of the universe (which we hold to be excited by the primary immovable substance) there are other spatial motions—those of the planets—which are eternal; then each of these spatial motions must also be excited by a substance which is essentially immovable and eternal. For the nature of the heavenly bodies is eternal, being a kind of substance; and that which moves is eternal and prior to the moved; and that which is prior to a substance must be a substance.<sup>7)</sup>

He further explains the purpose of the movement of the spheres.

For if everything which moves exists for the sake of that which is moved, and every motion for the sake of something which is moved, no motion can exist for the sake of itself or of some other motion, but all motions must exist for the sake of the stars. For if we are to suppose that one motion is for the sake of another, the latter too must be for the sake of something else; and since the series cannot be infinite, the end of every motion must be one of the divine bodies which are moved through the heavens.<sup>8)</sup>

Next, let me mention Maimonides' understanding of Aristotle. In the *Guide* II:4, he recounts the principles of spherical motions according to his understanding of Aristotle.

Accordingly it likewise is clear that the soul, in virtue of which there is the motion, and the intellect, by which the object is represented to oneself, are not both of them together sufficient to account for the coming-about of such a motion until desire for the notion represented is conjoined with them. Furthermore, it follows necessarily from this that the sphere has a desire for that which it represents to itself and which is the beloved object: namely, the deity, may His name be exalted. He [Aristotle] says that it is in this manner that the deity causes the sphere to move, I mean to say through the fact that the sphere desires to come to be like that which it apprehends, which is the notion represented—a notion that is most exceedingly simple, in which there is no change and no coming-about of a new state, and from which good always overflows.<sup>9)</sup>

This quotation confirms my assumption that Maimonides is a faithful Aristotelian. However, from the next quotation, this assumption becomes uncertain, in other words, Maimonides's explanation moves from the Aristotelian to the Neoplatonist.

## **VI. The opinion of Aristotle is identical to that of the Prophets and Sages**

It seems that Maimonides considered that the opinion of Aristotle was identical to that of the prophets and Sages because this is the basic idea in the *Guide*. Let me examine this point through several quotations from the *Guide*. Firstly, I will quote a passage from the *Guide* II:5.

Thus it has become clear to you that what Aristotle said likewise with regard to the sphere being endowed with apprehension and mental representation corresponds to the dicta of our prophets and of the bearers of our Law, who are the Sages, may their memory be blessed.

Know that there is a consensus of all the philosophers to the effect that the governance of this lower world is perfected by means of the forces overflowing to it from the sphere, as we have mentioned, and that the spheres apprehend and know that which they govern. This also is expounded in the letter of the *Torah*, which says: *Which the Lord thy God hath allotted unto all the peoples* (Deut. 4:19),<sup>10)</sup> which means that He made the spheres intermediaries for the governance of the created beings and not with a view to their being worshipped.<sup>11)</sup>

Let me continue quoting some other passages from the *Guide* II:12.

...it has been said that the world derives from the overflow of God and that He has caused to overflow to it everything in it that is produced in time. In the same way it is said that He caused His knowledge to overflow to the prophets. ...This term, I mean “overflow,” is sometimes also applied in Hebrew to God, may He be exalted, with a view to likening Him to an overflowing spring of water, as we have mentioned. ...As for our remark that the books of the prophets likewise apply figuratively the notion of overflow to the action of the deity, a case in point is the dictum, *They have forsaken Me, the fountain of living waters* (Jer. 2:13)—which refers to the overflow of life, that is, of being, which is life without any doubt. Similarly the dictum, *For with Thee is the fountain of life* (Ps. 36:10), signifies the overflow of being.<sup>12)</sup>

As you may notice, there is a very typical Neoplatonist term ‘overflow.’ Is the above mentioned description derived from Aristotle? If not, it is not Aristotle who is identical with the prophets and Sages, but Neoplatonists who are identical with the prophets and Sages. Before moving to the next quotation, I will first explain the basic ideas of Neoplatonism.

## VII. Characteristic Ideas of Neoplatonism

There are several characteristic ideas of Neoplatonism.<sup>13)</sup> Firstly, Neoplatonists describe the hierarchical structure of existence, namely that the material world is located at the bottom of this hierarchy. Secondly, each stratum overflows from the upper principle regardless of time, with the reciprocal structure of overflowing and returning. Thirdly, the stratum of the lower bottom represents the shadow of the upper stratum like a relationship between prototype and similitude. Fourthly, the uppermost principle does not have any attributes, accordingly, it is called the one (*to hen*). The above prescriptions came from Plotinus, who wrote *Enneads* edited by his disciple Porphyry. Plotinus explains the structure of three *hypostasis*, that is, the one (*to hen*), the intelligence (*nous*)

and the soul (*pshche*), indicating that the bottom stratum, the soul, integrates subject matter and constitutes an organic body. After Porphyry introduced Aristotle's logical terms into his commentaries on Aristotle, it became a major trend to study the commentaries on Aristotle's works if one needed to study philosophy. Through the Iamblichus' school in Syria, the influence of Neoplatonism gradually spread to the East. Because of the above events, Aristotelian thought in the twelfth and the thirteenth century came to be mixed with Neoplatonism.

### VIII. Cosmology of Maimonides influenced by Neoplatonism

Next, let me show you Maimonides' views on cosmology from the *Guide* II:10, which were influenced by the Greek philosophers although at the same time reflected the opinions of the Sages.

Thus the sphere of the moon moves the water, the sphere of the sun the fire, while the sphere of the other planets moves the air. ...It is likewise possible that the arrangement of the universe should be as follows. The spheres are four; the elements moved by the spheres are four; and the forces proceeding from the spheres into that which exists in general are four, as we have made clear. Similarly the causes of every motion belonging to the sphere are four: namely, the shape of the sphere—I mean to say its sphericity; its soul; and its intellect through which it has conceptions, as we have explained; and the separate intellect, which is its beloved. ...As for their dictum that an angel is equal in breadth to a third of the world—namely, their dictum in *Bereshith Rabbah*, which reads textually: *That the angel is the third part of the world*<sup>14)</sup>— it is very clear. And we have explained it in our great compilation on the legalistic study of the Law.<sup>15)</sup> For all created things are divided into three parts: the separate intellects, which are the angels; the second, the bodies of the spheres; the third, first matter—I mean the bodies subject to constant change, which are beneath the sphere.<sup>16)</sup>

Let me quote another passage from the *Guide* II:11.

For the whole intended purpose is to show that the existents that are below the Creator, may He be exalted, are divided into three parts: one of them being constituted by the separate intellects; the second, by the bodies of the spheres,...; and the third, by the bodies subject to generation and corruption,...It is further to show that governance overflows from the deity, may He be exalted, to the intellects according to their rank; that from the benefits received by the intellects, good things and lights overflow to the bodies of the spheres; and that from the spheres—because of the greatness of the benefits they have received from their principles—forces

and good things overflow to this body subject to generation and corruption. ...We have already explained that all these views do not contradict anything said by our prophets and the sustainers of our Law.<sup>17)</sup>

As you may notice, Maimonides expresses an opinion similar to the Greek philosophers' but uses slightly different terms. Furthermore, it seems that he is trying to coordinate these philosophical views with the views of the prophets and the Sages, although it sometimes appears to be quite difficult to reconcile them.

### **IX. Limitation of Man's Understanding**

Through the above quotations, you may notice that Maimonides was somewhat embarrassed to find that his understanding of Aristotle was slightly different from the understanding of Aristotle imparted by the philosophers of the Islamic world. That is to say, there were several incongruities between these perceptions. Accordingly, Maimonides concludes that man's understanding of things above the moon is eventually limited. I will quote a paragraph from the *Guide* II:24.

I shall accordingly say in the manner of potential preciousness: *The heavens are the heavens of the Lord, but the earth hath He given to the sons of man* (Ps. 115:16). I mean thereby that the deity alone fully knows the true reality, the nature, the substance, the form, the motions, and the causes of the heavens. But He has enabled man to have knowledge of what is beneath the heavens, for that is his world and his dwelling-place in which he has been placed and of which he himself is a part. This is the truth. For it is impossible for us to accede to the points starting from which conclusions may be drawn about the heavens; for the latter are too far away from us and too high in place and in rank.<sup>18)</sup>

Let me quote another long sentence from the *Guide* II:22.

...if the matter of all the spheres is one and the same, why is it not necessary for the form of one particular sphere to be transferred to the matter of another, in accord with what happens beneath the sphere of the moon because of the aptitude of matter? And why is one particular form permanently in one particular matter although the matter of all is common? ...Furthermore, if the matter of all the stars is one and the same, whereby are their individuals differentiated—is it by their forms or by accidents? ...Accordingly this summing-up will be as follows: Everything that Aristotle has said about all that exists from beneath the sphere of the moon to the center of

the earth is indubitably correct. ...On the other hand, everything that Aristotle expounds with regard to the sphere of the moon and that which is above it is, except for certain things, something analogous to guessing and conjecturing.<sup>19)</sup>

It seems to me that Maimonides compounded his perplexities between his understanding of Aristotle and other philosophers' understanding of Aristotle by concluding that man's knowledge was limited to only the things under the moon, and the things above the moon were not knowable for any human beings.

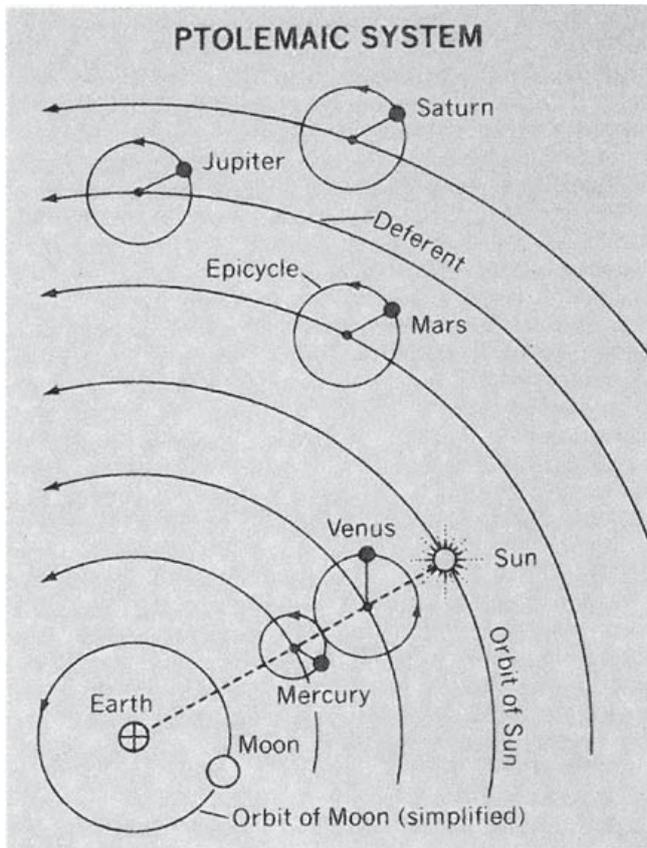
## **X. Sources of Maimonides' Cosmological Vision**

Through reading the above quotations, I came to recognise that Maimonides' view on Cosmology was neither Aristotelian, nor Neoplatonist, but rather was based on some other views, namely, the commentaries on Aristotle's work by Islamic thinkers. Lastly, to find cues for further study, I will quote some passages from Maimonides' letter to Ibn Tibbon, who translated the *Guide* from Judeo-Arabic to Hebrew.

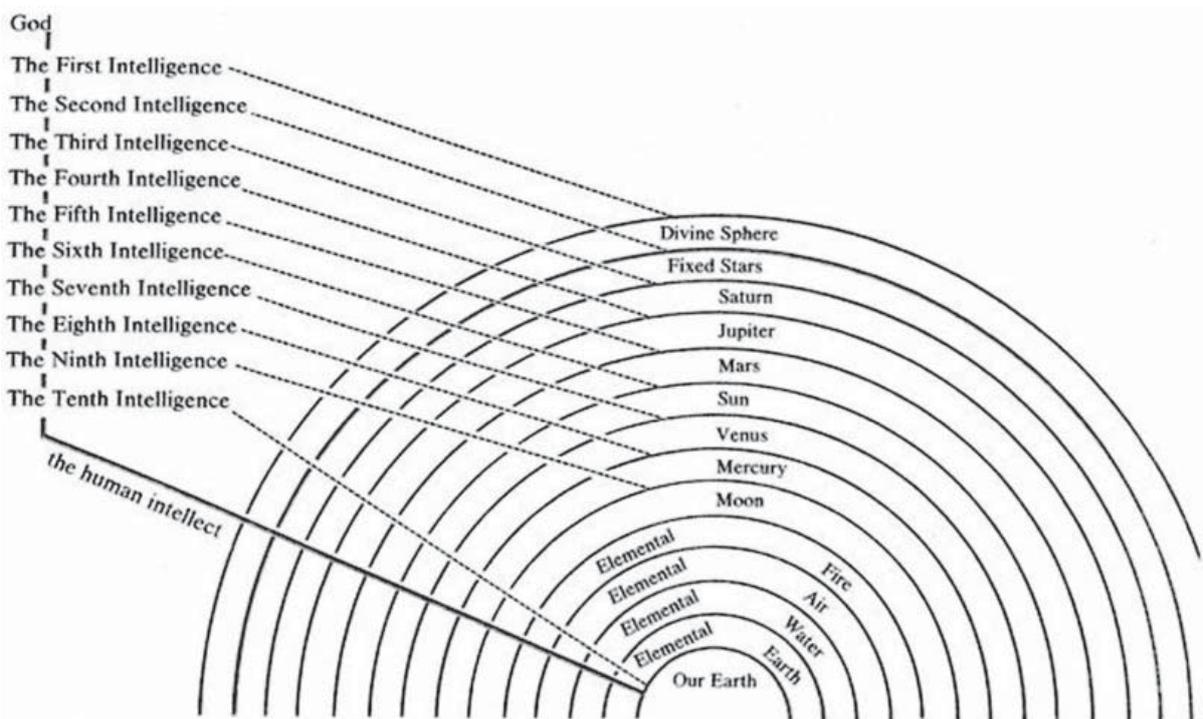
The writings of Aristotle's teacher Plato are in parables and hard to understand. One can dispense with them, for the writings of Aristotle suffice, and we need not occupy with the writings of earlier [philosophers]. Aristotle's intellect [represents] the extreme of human intellect, if we except those who have received divine inspiration. ...The works of Aristotle are the roots and foundations of all works on the sciences. But they cannot be understood except with the help of commentaries, those of Alexander of Aphrodisias, those of Themistius, and those of Averroes. ...I tell you: as for works on logic, one should only study the writings of Abū Naṣr al-Fārābī. All his writings are faultlessly excellent. One ought to study and understand them. For he is a great man. ...Though the work of Avicenna may give rise to objections and are not as good as those of Abū Naṣr [al-Fārābī], Abū Bakr al-Sā'igh [Ibn Bājjā] was also a great philosopher, and all his writings are of a high standard.<sup>20)</sup>

## **XI. Conclusion**

Through studying cosmology and cosmological ideas in the ancient and the medieval periods, I came to recognise that Maimonides' view on cosmology is not simple, but rather very complicated. I couldn't find the exact sources of his cosmological ideas in the above texts because his views were neither Aristotelian nor Greek Neoplatonist. Moreover, we need to pay attention to the Jewish



**Figure 1.** Ptolemy's *Planetary Hypotheses* "Ptolemaic System," in: *The Encyclopedia Americana International Edition, Vol.22* (Grolier Incorporated, Danbury CN, 1993), 742.



**Figure 2.** The Neo-Aristotelian Hierarchy

David R. Blumenthal, *Understanding Jewish Mysticism*, Vol. II (Ktav Publishing House, New York, 1982), 9.

traditions, that is, the *Bible*, *Talmud* and *Midrash* of the Sages. Presumably, he was influenced by Islamic thinkers' commentaries on Aristotle, namely, commentaries written by al-Farabi, Ibn Bajja, and Avicenna. The next task will be to search for the exact texts which influenced Maimonides's visions of cosmology.

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### **Notes**

- 1) Moses Maimonides. trans. H. M. Russell and J. Weinberg, *The Book of Knowledge from the Mishneh Torah of Maimonides* (New York: Katv Publishing House, 1983), 103.

- 2) Shlomo Sela, "Astrology in Medieval Jewish Thought," in: Gad Freudenthal (ed.), *Science in Medieval Jewish Cultures* (New York: Cambridge University Press, 2011), 292–300.
- 3) Judah Halvevi. trans. Hartwig Hirschfeld, *The Kuzari* (New York: Schocken Books, [1905]1964), 215.
- 4) Marcus Tullius Cicero, trans. W. H. Stahl, "Scipio's Dream," in: Macrobius, trans. W. H. Stahl, *Commentary on the Dream of Scipio* (New York: Columbia University Press, 1952), 72–73.
- 5) Bernard R. Goldstein, "Astronomy among Jews in the Middle Ages," in: Gad Freudenthal (ed.), *Science in Medieval Jewish Cultures* (New York: Cambridge University Press, 2011), 136–146.
- 6) Moses Maimonides. trans. Shlomo Pines, *The Guide of the Perplexed* (Chicago and London: The University of Chicago Press, 1963), 257.
- 7) Aristotle. [online]. "Metaphysics," in: G. R. Crane (ed.), *Perseus Digital Library* (Medford: Tufts University), Book 12, 1073a.  
<<http://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0052%3Abook%3D12%3Asection%3D1073a>> [accessed 24/06/13].
- 8) *Ibid.*, Book12, 1074a.
- 9) *Guide*, 256.
- 10) The whole verse is as follows: *And when you look up to the sky and behold the sun and the moon and the stars, the whole heavenly host, you must not be lured into bowing down to them or serving them. These the Lord your God allotted to other peoples everywhere under heaven.*
- 11) *Guide*, 260.
- 12) *Guide*, 279–280.
- 13) Hiroyuki Ogino, "Neoplatonism," in: *Encyclopaedia of Philosophy and Thought* (Tokyo: Iwanami, 1998), 839–840.
- 14) *Genesis Rabbah*, 68.
- 15) *Mishneh Torah*, Yesodei ha-Torah, II:3. The whole verse is as follows: *All that the Blessed One created in the world He divided into three parts. Some are composite creatures of matter and shape which exist and pass away like the bodies of men, animals, plants and minerals. Some are composite creations of matter and shape which do not change in shape and form like the first group; their form is fixed for ever and their substance is unchanging. They are the planets and the stars around them; their matter is not like other matter nor is their form like other forms. Others are creations which have form but no matter and they are messengers who have no body or substance but they differ from one another.*
- 16) *Guide*, 270–71, 273.
- 17) *Guide*, 274–276.
- 18) *Guide*, 326–327.
- 19) *Guide*, 318–320.
- 20) Shlomo Pines, "Translators Introduction," in: Moses Maimonides. trans. Shlomo Pines, *The Guide of the Perplexed* (Chicago and London: The University of Chicago Press, 1963), lix–lx.