

## Study of the Universe via Planets Phenomena: Jupiter contribution

Correspondence to Chiara Maria Cocchiara . Email: chiara.cocchiara@hotmail.it



Since the beginning of the studies regarding Space, astronomers have been interested not only in what happens in the surroundings of our Planet, but they wanted to look further in order to understand the “reasons of the Universe”. As such, the European Mars Express and Venus Express are still working giving back interesting results regarding Mars and Venus, and in the same way, Cassini is giving us results regarding Saturn. Of greatest importance is the study of Jupiter, and scientists are pushing towards a deeper knowledge of this planet. Jupiter and his system can give a large contribution to the study of our Solar System, especially because of its difference comparing to the other planets. As a matter of fact, contrary of what is always thought, Jupiter teaches that not only the Sun is the key of our System, instead, many factors can be determined by different bodies, such as its moons. Moreover, the idea of moons, regarding Jupiter, should be considered under a different point of view.

The history of Earth’s moon is often considered secondary with respect to the Planet. The same cannot be said regarding Jupiter’s moons. As a matter of fact, Io, Europa, Calisto and Ganymede, have their own properties which make their “life” to be as important as the Planet one. Each of these moons can help in understanding the life of Planet Jupiter, and help in studying space environment.

One of the most interesting and beautiful phenomena that have to be considered regarding

Jupiter is the Aurora. In order to occur, three conditions have to be satisfied: a source, an atmosphere, a magnetic field. Commonly, the source is the Solar Wind, while atmosphere and the magnetic field are from the planet. In the case of Jupiter, several differences occur. First of all, the magnetic field is generated due to the spin of the planet: it is not an intrinsic property. Moreover, the Solar Wind density is much lower, and the mass contribution (due to the process of mass loading), is given by the particles coming from Io. The *mass loading* and *reconnection* are the main processes that are studied. Of great importance is the fact that these studies are useful because they can be found in other Space regions: other planets, such as Earth, show same properties.

Of great interest is the moon Europa, where ice have been discovered, and water under it. Since the study of the universe started, one of the main question is regarding the possibility of life in other planets, and the discovery of water in this moon, can be very interesting for conducting these kind of study.

Same importance is given also to Ganymede, which is the only moon which shows an intrinsic magnetic field, which produces a magnetosphere within Jupiter’s magnetosphere.

The study of Jupiter and its mechanisms and phenomena (such as Aurora), can give a big contribution to the knowledge of the Universe.