

## Galileo Galilei and Johannes Kepler in 1609: Consideration of the International Year of Astronomy 2009

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Through a proposal by the IAU, recommendation by UNESCO and a resolution of the UN, the International Year of Astronomy (IYA 2009) had been arranged. IYA 2009 marks the 400th anniversary of the first astronomical observation through a telescope by Galileo Galilei. In 1609, Galilei made some outstanding discoveries including recognition of four moons which move around Jupiter. It will be a global celebration of astronomy with events throughout the whole of 2009.

In the same year, 1609, Kepler published his work *Astronomia nova* in which he described his first and second laws of planetary motion. Kepler discovered these laws by analyzing the enormous body of observations of planets made by Tycho Brahe over many years.

In 1543, Copernicus published *De Revolutionibus Orbium Coelestium*. He set his own outlook on universe against the conventional geocentricism. According to his view, planets including the earth describe heliocentric orbits. In the Middle Ages, the Ptolemaic theory had been authorized by the Catholic Church. The Copernican theory was taken as a heresy which threatens the established Christian belief regarding the structure of the universe. Those who stand for the Copernican theory were subjected to persecution. In such circumstances, the discovery of satellites around Jupiter brought forward convincing evidence of small celestial bodies moving around a big body. This offered strong support that favored the Copernican view.

Kepler showed that the orbit of planets was an ellipse with the Sun in one of its foci. Conventionally, orbits were compounded of circles. This generalization was of great significance. A line joining the planet to the Sun describes equal areas in equal times. Kepler's discovery established a new phase of research into the kinematical structure of the solar system. In 1619, Kepler made public his third law of planetary motion that for any two planets the ratio of the squares of their periods would be the same as the ratio of the cubes of the mean radii of their orbits. Newton's discovery of the law of universal gravitation owed to this law. The solution to the problem of two bodies was found to be a conic section from the laws of motion and the law of universal gravitation. Owing to Kepler's first and second laws the validity of the dynamical theory was confirmed.

It lacks any significance to raise a question of which of achievements by Galilei or by Kepler are more valuable. However, Kepler's contribution must never be dismissed when we have an anniversary of the astronomical achievements in 1609.

IYA2009 Japan Committee was established. It is chaired by Prof. Norio Kaifu. Prof. Kaifu delivered a message, title of which is 'Let us share the Galilei's surprise'. A description of IYA2009 is given without making any reference to Kepler. Prof. Kaifu states definitely that Galilei's discovery is the greatest in the history of science. Even though Prof. Kaifu intended to give people a vivid impression of the importance of Galilei's discovery, this can never be overlooked, because it is quite far from the reality.

In order to help people's understanding of science forward, it is almost inevitable to simplify things and to appeal to people's intuition as a first step. However, the matter of the first importance lies in how to give people a better understanding of science as it is. Scientific research is the involuted workings of a human being.

Together with Galilei, Kepler played a major role in establishing the dynamical theory. IYA2009 Japan Committee had to give an account of Kepler's honorable achievements, even if it is beyond people's understanding for the present.