

RADIO SEARCH FOR EXTRASOLAR COMETARY IMPACTS AT 22 GHz (WATER MASER EMISSION). C. B. Cosmovici¹, S. Pogrebenko², S. Montebugnoli³, and G. Maccaferri³, ¹IFSI/CNR, Fosso del Cavaliere 100, Roma, Italy, ²JIVE, P.B. 2, 7990 AA Dwingeloo, The Netherlands, ³IRA/CNR, Via Fiorentina, 40060 Villa Fontana, Bologna, Italy.

The impact of 21 fragments of Comet Shoemaker-Levy/9 with the jovian atmosphere in July 1994 gave astronomers for the first time the opportunity to study the chemistry and physics of a planet during a catastrophic impact. A great amount of scientific data could be achieved by using space- and ground-based facilities and one of the most important results was the delivery of water and new molecules into the atmosphere of Jupiter. These observations could support the theory that, between 4.5 and 4 billion of years ago, the necessary water and organics were delivered to Earth by showers of comets, thus permitting the development of life. As comets are universal objects and the organics contained in their nuclei are originated in interstellar clouds responsible for stellar and planetary origins, we may assume that comets are delivering the "bricks" of life, containing the same biochemical information, everywhere in the galaxy.

By using a 132.000 channel spectrometer coupled to the 32 m dish of the Medicina radiotelescope (Bologna, Italy), we were able during the impact of the cometary nuclei

with the upper atmosphere of Jupiter not only to detect water at 22 GHz, but to observe for the first time in the solar system a water MASER emission induced by a catastrophic impact [1]. This emission line was originated by a water cloud released from cometary ices after the explosion of the nuclei in the upper atmosphere of Jupiter. Thus water MASER emission can be used as a powerful diagnostic tool for planetary search outside the solar system, as comets are able to deliver huge amounts of water (about 50 billion tons per comet) in planetary atmospheres rising the probability of life development. We started therefore a search program at Medicina using the same multichannel spectrometer in order to cover the Doppler shifts due to planetary rotation. The most suitable candidates for such a search, within 50 light years, are stellar systems like Epsilon Eridani and Beta Pictoris where clouds of comets surrounding the stars have been discovered.

References: [1] C. B. Cosmovici, S. Montebugnoli, A. Orfei, S. Pogrebenko, and P. Colom (1996) *Planet. Space. Sci.*, 44, 735.