

Seminar

by

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Cool planets of Cool stars

Survey of extrasolar planets have now reached a level at which it becomes feasible to detect planets down to only a few Earth-masses. Recently, surveys of low-mass stars have become popular, because the detection of low-mass planets orbiting such stars is less difficult than for solar-like stars. Prior to the detection of extrasolar planets, it was generally believed that extrasolar planets would resemble the planets in our solar system. Planets in our solar system are either gas (ice) giants which have densities between 0.7 to 1.6 gcm⁻³, or rocky planets with densities between 3.7 to 5.5 gcm⁻³. There is now growing evidence that extrasolar planets have a much larger diversity than the planets in our solar system. For example, how is possible that two planets of the same mass can have very different densities? One possibility is that the erosion of planetary atmospheres caused by stellar activity plays a role in the sense that low-mass planets have extended Hydrogen atmospheres, and high-density planets have lost it. Since potentially habitable planets of low-mass stars orbit at much closer distance from their host stars than the Earth, and since many low-mass stars are relatively active, the erosion of planetary atmospheres could potentially be more relevant for low-mass planets of low-mass stars than it is for the Earth. In the past years we have carried out an intensive campaign to study the flare activity and coronal-mass ejections of low-mass stars. The results of this study will be presented. Recent measurements of the densities of close-in planets have also shown that some of them must have much larger cores than the Earth. This means that also there also a large diversity of the internal structures of low-mass planets. Furthermore, the interaction between the host star and the planet may also lead to enhanced volcanism. What are the prospects of detecting volcanisms on extrasolar planets? Many extrasolar planets that are not much larger, or more massive than the Earth thus seem to be quite different from the Earth. There is thus more and more evidence that extrasolar planets are much more diverse than previously thought.