

Astrobiological Effects of Stellar Radiation in Environments of Solar-Type Stars

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The centerpiece of all life on Earth is carbon-based biochemistry. It has been surmised that biochemistry based on carbon may also play an important role in extraterrestrial life forms, if existent. In the following, we explore if carbon-based macromolecules (such as DNA) in the environments of stars other than the Sun are able to survive the destructive effects of energetic stellar radiation, such as UV-C. In that regard, we focus on main-sequence stars akin to the Sun, but of hotter (F-type stars) and cooler (K- and M-type stars) surface temperature. Emphasis is placed on investigating the radiative environment in the stellar habitable zones. Stellar habitable zones are relevant to astrobiology because they constitute circumstellar regions in which a planet of suitable size can maintain surface temperatures for water to exist in fluid form, thus increasing the likelihood of Earth-type life.