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EXTRASOLAR PLANETS : TODAY AND TOMORROW

Contributed

Terrestrial Planet Formation in Binary Star Systems

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Most stars reside in multiple star systems; however, virtually all models of planetary growth have assumed an isolated single star. Numerical simulations of the collapse of molecular cloud cores to form binary stars suggest that disks will form within such systems. Observations indirectly suggest disk material around one or both components within young binary star systems. If planets form at the right places within such circumstellar disks, they can remain in stable orbits within the binary star systems for eons.

We are simulating the late stages of growth of terrestrial planets within binary star systems, using a new, ultrafast, symplectic integrator that we have developed for this purpose. We show that the late stages of terrestrial planet formation can indeed take place in a wide variety of binary systems and we have begun to delineate the range of parameter space for which this statement is true. Results of our initial simulations of planetary growth around each star in the alpha Centauri system and other 'wide' binary systems, as well as around both stars in very close binary systems, will be presented.