

Radiative-dynamical equilibrium in extrasolar fluid planets

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Based on a two-dimensional radiative-dynamical equilibrium theory, constraints for fluid planets such as (i) 'hot Jupiters' in the vicinity of a star and (ii) 'ultra-elliptic-orbit' planets are studied. For (i), the astronomical constraint (rotation must be synchronous with revolution) and the GFD constraint (rotation or zonal flow must be equilibrated with star-planet radiation and meridional heat transport) are requested. For (ii), a planetary 'seasonal' variation forced by the variation of star-planet distance may be constrained by a meridional temperature gradient and/or dynamical processes.