Radiation and plasma heating of upper planetary atmospheres

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Solar radiation and energetic plasma processes can act to change the character of upper planetary atmospheres because gasses are no good heat conductors. Therefore, the majority of the energy of photons and energetic particles which are deposited below the collision less atmosphere region, the exobase, provides a heat source which raises the temperatures and expands the upper planetary atmospheres. If the energy is deposited close to the exobase, the change in scale height of the exosphere can be dramatic. Such atmospheric expansion gives a larger target area and a lower gravitational binding energy to the planetary body for collisional particle ejection. We show the results on radiation and charged particle heating effects on various planetary atmospheres and discuss the importance of these heating pro-cesses for the evolution of their atmospheres, including the application to exosolar planets.