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Hydrogen density in the dayside Venusian exosphere derived from Lyman-alpha observations by SPICAV on Venus Express

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A series of observations of the Venusian hydrogen corona done by SPICAV on Venus Express are analyzed to estimate the amount of hydrogen in the exosphere. These observations have been done between November 2006 and July 2007 at altitudes from 1000 km to 8000 km on dayside. The Lyman-alpha brightness profiles derived are reproduced by the sum of a cold hydrogen population dominant below ∼2000 km and a hot hydrogen population dominant above ∼4000 km. The temperature (∼ 300 K) and hydrogen density at 250 km (∼100,000 cm-3) derived for the cold population, near noon, is in good agreement with previous observations. Strong dawn-dusk exospheric asymmetry is observed from this set of observations, with a larger exobase density at dawn side than dusk side, consistent with asymmetry previously observed in the Venusian thermosphere, but with a lower day/night contrast. The hot hydrogen density derived is very sensitive to the sky background estimate but well constrained near 5000 km. The density of the hot population is reproduced by the exospheric model in which the hot population is produced by neutral – ions interactions in the thermosphere.