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Observations of CO and HCN on Neptune with Herschel SPIRE

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In the framework of the Herschel Key Project "Water and Related Chemistry in the Solar System" (Hartogh etal 2009), Neptune has been observed with the SPIRE Fourier Transform Spectrometer (FTS).The spectra was recorded on June 9th 2010 at a spectral resolution of 0.048 cm-1 and cover the spectral region from 15 to 50 cm-1, for the first time.

More than 10 lines of CO have been detected with a combination of absorption and emission.The broad absorption components probe deeper in the troposphere and the emission parts probe the stratosphere. The analysis of these lines will allow to derive the vertical distribution of CO in Neptune's atmosphere. These new data will add constraints to the expected non-uniform vertical distribution, that would result from a dual internal/external origin, as previously proposed by Lellouch et al. (Astronomy and Astrophysics, 2005), and Hesman et al. (Icarus, 2007). Additionally, a few emission lines of HCN are also detected.

The analysis of these data will be presented, studying in particular the sensitivity of the retrieved vertical distribution to the thermal profile. A comparison with other Herschel observations (PACS), and ground-based observations (IRAM-30m) will also be presented.