HIGH RESOLUTION FAR INFRARED FOURIER TRANSFORM SPECTROSCOPY OF THE NH_2 RADICAL.

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First identified toward Sgr B2[a], the NH_2 radical has recently been detected in the interstellar medium by the HIFI instrument on board of Herschel[b]. Despite the fact that this radical has not been detected in brown dwarfs and exoplanets yet, it is already included in physical and chemical models of those environments[c] (temperature higher than 2000 K expected in several objects). Its detection in those objects will depend on the existence of a reliable high temperature and high resolution spectroscopic database on the NH_2 radical.
The absorption spectrum of NH_2 has been recorded between 15 and 700 cm^{-1} at the highest resolution available using the Bruker IFS125HR Fourier transform interferometer connected to the far infrared AILES beamline at SOLEIL (R=0.001 cm^{-1}). The radical was produced by an electrical discharge (DC) through a continuous flow of NH_3 and He using the White-type discharge cell developped on the beamline (optical path: 24m).
Thanks to the brilliance of the synchrotron radiation, more than 700 pure rotational transitions of NH_2 have been identified with high N values (N_{max}=25) in its fundamental and first excited vibrational modes. By comparison to the previous FT spectroscopic study on that radical in the FIR spectral range[d], asymmetric splitting as well as fine and hyperfine structure have been resolved for several transitions.

[a] E. F. Van Dishoeck, D. J. Jansen, P. Schilke, T. G. Phillips *The Astrophysical Journal 416, L83-L86 (1993)*
[b] C. M. Persson, J. H. Black, J. Cernicharo et al. *Astronomy and Astrophysics 521, L45 (2010)*
[c] K. Lodders and B. Fegley, Jr *Icarus 155, 393424 (2002)*
[d] I. Morino and K. Kawaguchi *Journal of Molecular Spectroscopy 182, 428-438 (1997)*