SPECTRA OF PLUTO AND CHARON RESOLVED UP TO 5µm: IMPLICATIONS FOR SURFACE PROPERTIES. S. Protopapa[1], H. Boehnhardt[1], T. M. Herbst[2], D. P. Cruikshank[3], W. M. Grundy[4], F. Merlin[5] and C. B. Olkin[6], [1] Max-Planck Institute for Solar System Research, Max-Planck-Str. 2, 37191 Katlenburg-Lindau, Germany, protopapa@mps.mpg.de and boehnhardt@mps.mpg.de, [2]Max Planck Institute for Astronomy, Königstuhl 17, 69117 Heidelberg, Germany, herbst@mpia.de, [3]NASA Ames Research Center, Mail Stop 245-6, Moffett Field, CA 94035, USA, Dale.P.Cruikshank@nasa.gov, [4]Lowell Observatory, 1400 W. Mars Hill Rd., Flagstaff, AZ 86001, USA, w.grundy@lowell.edu, [5]LESIA, Observatoire de Paris, 92195 Meudon Principal Cedex, France, frederic.merlin@obspm.fr, [6]Department of Space Studies, Southwest Research Institute, Boulder, CO, USA, colkin@boulder.swri.edu.

We present the first resolved Pluto and Charon spectra up to 5µm and 4µm, respectively. These data, obtained with the adaptive optics instrument NACO at the ESO VLT during 3-7 August 2005, provide important tools to improve the current state of knowledge of Pluto and Charon's surfaces. Indeed it is the first time that the complete L band spectrum of Pluto is measured without unresolved contamination by light from Charon [1,2], while its M-band spectrum was never measured before. Charon has been studied in some detail in the JHK wavelength region [3,4], but was never measured beyond 2.5µm. Extending the wavelength coverage of the surface spectroscopy beyond K band permits to assist New Horizons mission that will perform spectroscopy of Pluto's surface in JHK band only (Pluto's encounter is scheduled for July 2015). The nature and properties of the compounds present on the surface of Pluto and Charon are investigated by applying a Hapke radiative transfer model to the measured spectra.

Apart from known and expected absorption bands from methane ice, our Pluto spectrum reveals a new absorption band centered around 4.6 µm, never detected before. This absorption band could be related to the presence of nitriles, arising from C and N connected with a triple bond. A geographic mixture of pure methane ice with two different grain sizes, methane and CO ice diluted in nitrogen, CH_2CHCN and titan tholin fits best Pluto's spectrum, although not in all details. Comparing the Pluto observations obtained at VLT in 2005, with the ones obtained at Keck in 2001 [1], we note a significant change of the CH_4 absorption slope between 2.9 and 3.1µm. The modeling analysis of NACO and Keck observations revealed that the concentration of pure CH_4 may have increased by 15% from 2001 to 2005.

Charon's spectrum obtained by NACO in 2005, is not contaminated by light from Pluto and extends well beyond 2.6µm. The "standard model" of Buie & Grundy [3], extended beyond 2.6µm matches Charon's spectrum inside the errors - although the modeled albedo is systematically lower than the measured one beyond 3.2µm. NACO measurements for Charon enabled to calculate the hypothetical spectral properties of the unknown neutral absorber beyond 2.6µm to compensate for this deviations.

References: [1] Olkin C. B. et al. (2007) *AJ, 133,* 420–431. [2] Grundy W. M. et al. (2002a) *AJ, 124,* 2273-2278. [3] Buie M. W. and Grundy W. M. (2000) *Icarus, 148,* 324-339. [4] Cook J. C. et al. (2007) *APJ, 663,* 1406-1419.