Laboratory Astrophysics for Near-Infrared Astrophysical Applications

H.Hartman[*,†], H.Nilsson[†], N.Ryde[†], R.Blackwell-Whitehead[†], N.Linne[†], A.Pehlivan[†], S.Huldt[†], L.Engström[**], H.Lundberg[**], P.Jönsson[*] and J.Grumer[**]

[*]*Malmö University, Applied Math and Material Science, SE-20506 MALMÖ, SWEDEN*
[†]*Lund Observatory, Lund University, SE-22100 LUND, SWEDEN*
[**]*Physics Department, Lund University, SE-22100 LUND, SWEDEN*

Abstract. Astronomical near-infrared (NIR) observations are attracting more interest, and telescopes are being equipped with high-resolution NIR spectrographs. The next generation telescopes will have optimal performance in the nIR and high-resolution instrumentation.

The scientific interest for the NIR has several reasons, among them the interest in cooler stars having intensity peaks in this region, and also studies of obscured regions where the extinction prevents studies in short wavelength regions. In addition, several atomic and molecular species in astronomically interesting sources also have optimal transitions for abundance studies in the NIR.

Judging from the available atomic data bases, there are few known atomic transitions in the infrared region. Part of the explanation for this is the lack of interest from the atomic physics community. Motivated by this, we are running a program to improve the amount and accuracy of atomic transition data in the nIR with priorities from astronomical observations. The CRIRES-POP program on VLT/CRIRES will be a source for these priorities.

Parameters of interest are wavelengths, oscillator strengths and line profiles (hyperfine and isotopic structure). Measurements are complemented by atomic structure calculations where applicable. Current studies include the measurements of Y I, Sc I and La I, which all have strong, low-excitation lines appearing in the atmospheric transmission bands.

The Edlen laboratory at Lund Observatory is equipped with a high-resolution FTS optimized for the infrared region. At Lund High Power Laser facility, a laboratory dedicated to radiative lifetime measurements is being adopted for NIR measurements.

Keywords: <Enter Keywords here>
PACS: 32.70.Cs, 32.70.Jz, 95.85.Jq, 97.10.Tk