NUMERICAL AND EXPERIMENTAL ASPECTS OF DATA ACQUISITION AND PROCESSING IN APPLICATION TO TEMPERATURE RESOLVED 3-D SUB-MILLIMETER SPECTROSCOPY FOR ASTROPHYSICS AND SPECTRAL ASSIGNMENT.

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Experimental determination of the lower state energy for every transition in molecular spectra, made possible by temperature resolved 3-D spectroscopy, opens new frontiers in our ability to predict molecular spectra over a wide range of temperatures and to assign rotational spectra in many vibrational states. Our improved collisional cooling cell design extends temperature coverage of this technique to 77 K. This enhances our ability to simulate molecular spectra at temperatures of astronomical relevance. We are reporting on experimental and numerical aspects of dealing with exceptionally high information content of these spectra. New data reduction algorithms allow us to process this data in timely fashion in an attempt to make them available to astronomical community.