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Physical properties of Brackett Emitters in the APOGEE DR17 Catalog

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(This abstract is a placeholder for a project to be submitted for publication elsewhere.)

Abstract
In the process of accumulating mass (accretion), young stars channel ionized gas from the protoplanetary disk to the stellar surface along magnetic field lines. Upon impacting the photosphere, the gas cools down, recombining and emitting hydrogen spectral lines. Measuring these emission lines allows us to determine the temperature and density of the gas in those accretion streams. This then enables us to test whether those parameters depend on the accretion rate. We present measurements of equivalent widths and line ratios for Brackett (Br) 11 – 20 lines for 3366 observations of 940 pre-main sequence stars observed with APOGEE as of Data Release 17. We identify the subset of stars with strong detections down to Br20, and fit the resulting line ratios to predictions of radiative transfer models. We also estimate physical properties inferred from the strongest accretors, such as hydrogen densities between 1011 and 1012 cm-3. Their temperatures appear to be less constrained, but model fits suggest the excitation temperature is inversely proportional to the hydrogen density. Finally, we describe plans for future work to calibrate the flux within Br11 line as a proxy for the mass accretion rate.