

Title: Modeling planet formation in the Milky Way

It is difficult to observe physical parameters of a planet forming system, or protoplanetary disk, due to their sizes and distance from Earth. This becomes increasingly difficult with increasing distance. This means that it is necessary to study “nearby” places that have similar environments to the early universe in order to indirectly study planet formation during the early universe. In order to figure out the physical parameters of the disk, it is often easier to create a model that has the same amount of light emitted at each wavelength the disk being observed at. Whichever physical parameters are used in the model described above should also describe the physical disk being observed.

The process of creating the models is straightforward. Calibrating the models is a larger challenge. In order to create the models it takes only a few lines of code given by a researcher named C.P. Dullemond. Dullemond wrote the code known as RADMC-3D that is used in Professor Keller’s lab to create the models.

This research is part of a larger project looking at how planets would have formed in the early universe and differences in them from planets that formed more recently. HD100453 and HD34282 are the two protoplanetary disks that are focused on in this part of that project. They are both well studied and the physical parameters are known to a high degree of certainty. This opens the path for future students to work on modeling planets in environments more similar to the early universe than the Milky Way is. The process of calibrating the modeling software happens by successfully creating models that match observed data and other people’s models of these well known systems. This presentation will be on the array of models created so far and progress in calibrating the code for work on new systems.