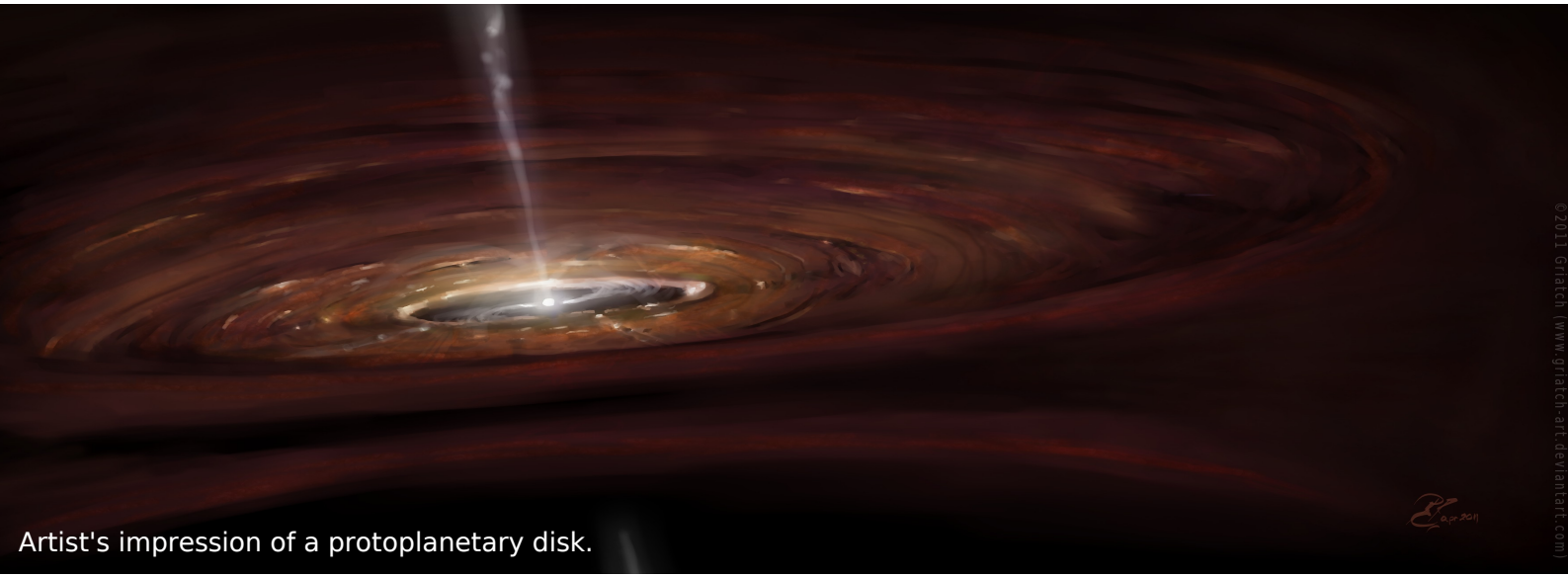
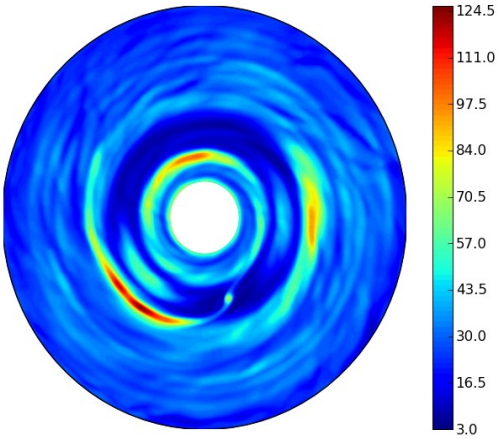
Computer models of proto-planetary disks

New-born stars are surrounded by rotating disks of gas and dust. These so-called proto-planetary disk are the places where planets form. Their structure and evolution directly influences how the resulting planetary system will look.

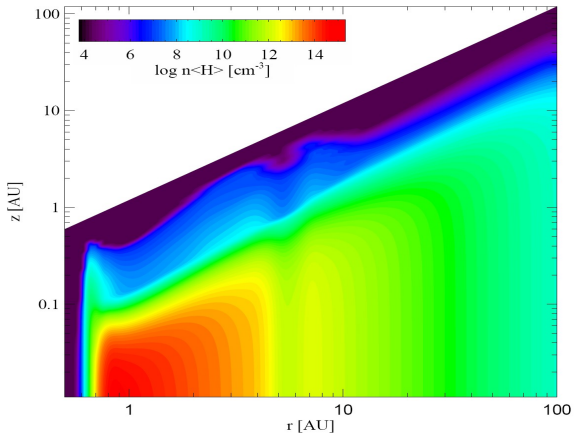
By modelling such disks in three dimensions, using realistic local conditions and energy transport, we can emulate observable quantities for disks with or without planets forming inside them. These results can then be compared and verified with actual observed data.



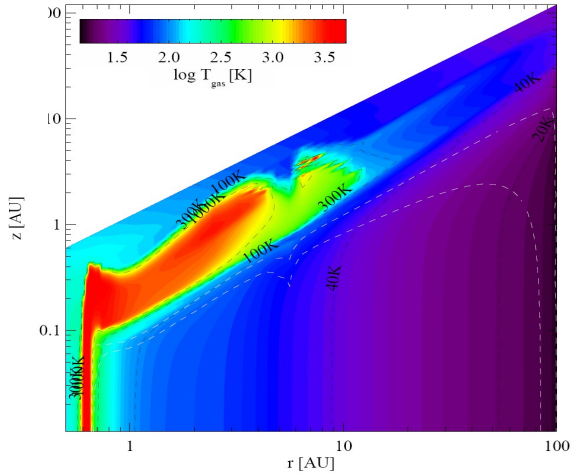
Artist's impression of a protoplanetary disk.



Vertical collumn density structure for a disk. The structure is turbulent and we see the embryo of a giant planet forming at roughly the position of Jupiter,



Cut-out of the vertical density disk structure (star is on the left). We see a decrease in density around 5 AU where the planet has opened up a gap in the disk.



The young star's light is the main source of energy in the disk at this stage of evolution. The gas surface is heated whereas the inner parts are very cool. This directly influences the simulated spectrum.

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