

GIANT MOLECULAR CLOUDS

Giant Molecular Clouds are sometimes referred to as the "fuel tanks" for star formation - because they contain the material that will form the next generation of stars. These clouds of gas (mostly molecular Hydrogen or H_2) remain relatively cool until some event disturbs them, and they begin to collapse under their own gravity. They may be triggered to collapse by a nearby supernova, or by colliding with another molecular cloud. As they begin to collapse, they fragment into smaller and smaller pieces, and eventually, in the most dense regions, enough mass is gathered together to make a star.

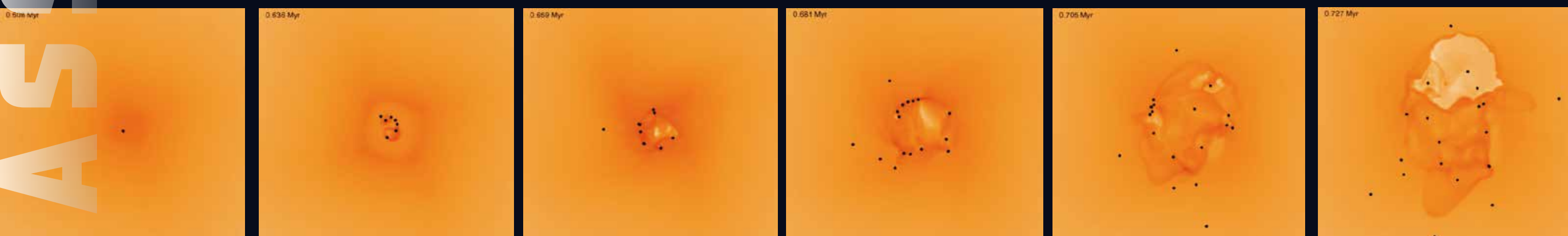
Because young star forming regions are buried deep in the centers of these clouds, these regions are invisible at optical wavelengths, and have to be observed with radio telescopes like the Very Large Array (VLA).



FLICKERING REGIONS

As a cloud of gas fragments to form a family of stars, gravity pulls the cloud into filaments of dense material. The most massive of the young stars in the cloud are hot enough to ionize the hydrogen around them (that is, tear apart the protons from the electrons), and create regions of high temperature gas called HII regions. The smallest of these regions are called ultracompact HII regions. As these hot stars move through this cloud of filamentary material, they flicker between being able to ionize a large region and just a small region. If they travel into a very dense filament, they cannot ionize as much of it, and will appear small. These "flickers" can happen quickly when they do happen.

Computer models have shown that these changes can occur, and astronomers are looking to detect these brightness changes in real sources. The frames below show the evolutions of one such region. In the model, each frame is a hundred years.



HII REGIONS

Eventually, the stars that have formed in a molecular cloud put out so much energy that they start to disperse the cloud that gave birth to them. As they push away material, they expose the whole family of stars that have been created deep within the molecular cloud.

Often times, these regions will "blow out" one side of a molecular cloud, as in the case of the Orion Nebula. This familiar winter object is one such region that has opened up toward us, and we see into its depths. The "Trapezium" stars are ionizing a large region of hydrogen gas, and huddled around these four very large stars, we can see hundreds of other smaller stars, more like the Sun.