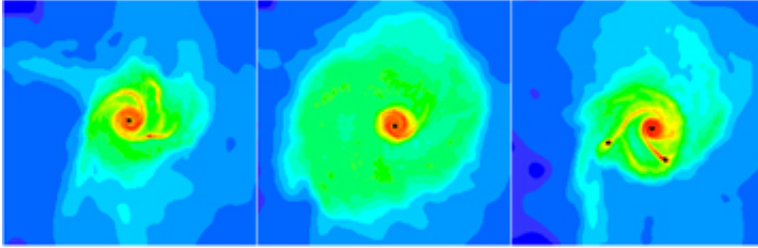


Baby stars born to 'napping' parents

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(PhysOrg.com) -- Cardiff University astronomers believe that a young star's long "napping" could trigger the formation of a second generation of smaller stars and planets orbiting around it.

It has long been suspected that the build up of material onto [young stars](#) is not continuous but happens in episodic events, resulting in short outbursts of energy from these stars.

However, this has been largely ignored in models of star formation.

Now, by developing advanced computer models to simulate the behaviour of young stars, Cardiff University Astrophysicists Dr Dimitris Stamatellos and Professor Anthony Whitworth, along with Dr David Hubber from the University of Sheffield, have offered a new insight in [star formation](#).

While stars are young they are surrounded by discs of gas and dust, and grow by accreting material from these discs. The discs may break-up to give birth to smaller stars, planets and [brown dwarfs](#) - objects larger than planets but not large enough to burn hydrogen like our Sun.

"We know that young stars spend most of their early lives sleeping," said Dr Dimitris Stamatellos. "After they have their lunch, a large chunk of dust and gas from their discs, they take a nap that lasts for a few thousand years. During this nap their brightness is very low.

"As they sleep, their discs grow in mass, but they remain relatively cool, despite the presence of stars right at their centres. Eventually, these discs become unstable and fragment to form low-mass stars and substellar objects, like brown dwarfs and planets."

To date, research has suggested that the radiation from the [parent star](#) could heat and stabilize the disc, suppressing its breaking up.

However, the researchers discovered that there is ample time in between outbursts to allow the disc to break up and give birth to a new generation of low-mass stars, brown dwarfs, and planets.

The new theory provides an explanation for the formation and the properties of stars with masses below a fifth of that of our Sun, which are estimated to constitute more than 60% of all stars in our Galaxy.

"Our findings suggest that disc fragmentation is possible in nature," says Dr Stamatellos.

"It is important now to investigate whether this is the dominant mechanism for the formation of low-mass stars and brown dwarfs," he adds.

More information: The research was published in the *Astrophysical Journal*.

Provided by Cardiff University

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