What do brown dwarf discs tell us?

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What everybody knows…

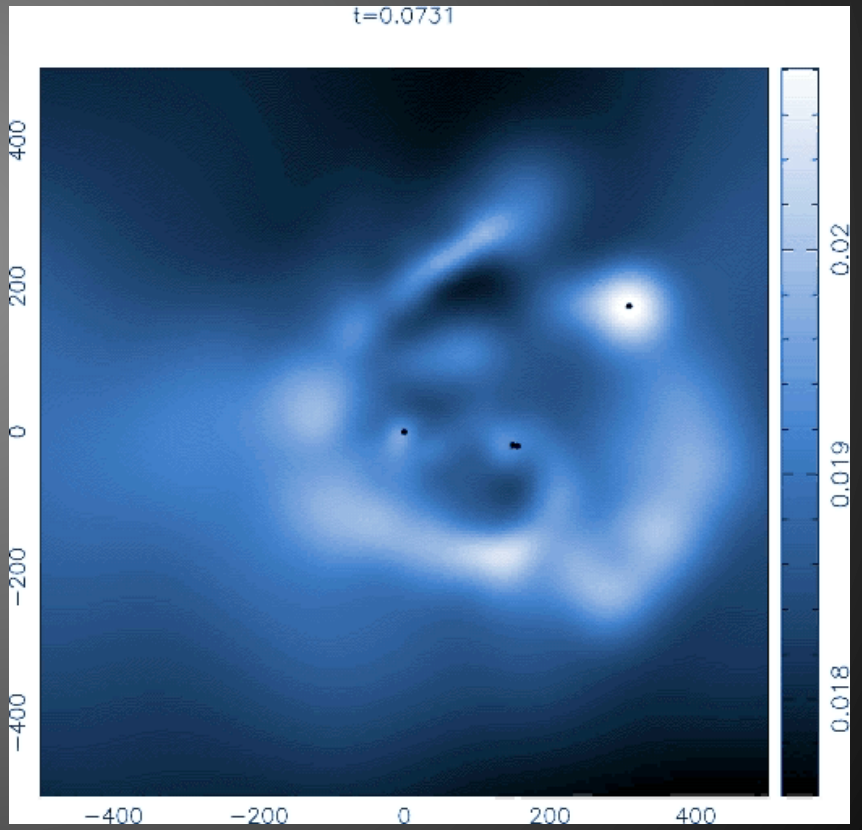
Brown dwarf discs tell us about the formation mechanism of brown dwarfs

- Ejection models produce discs,
- Core formation models produce discs.

Can ejection give discs?

Yes. Even in violent ejection models (Bate et al. 2003; Goodwin et al. 2004) brown dwarfs can retain small (5-10 au) discs.

In gentle liberation models (Stamatellos et al. 2007; Goodwin & Whitworth 2007) very large discs up to the 40au maximum can be kept.



Do cores give discs?

Maybe, maybe not. It all depends on how big the core is and how much angular momentum it has:

$$R_{disc} = \beta_0 R_{core}$$

BD-mass cores are probably small (<500 au?), so discs probably can't get any larger than about 50 au.

What happens if magnetic fields stop disc formation (Hennebelle & Teyssier 2008)? Then cores might not produce any discs!

The problem with BD binaries

BD binaries *cannot* form by disc fragmentation.

In order for a disc to fragment the mass of the disc must be >> the mass of the fragment.

As fragments are about 10^{-2} $M_{\odot}$, the disc mass must be greater than about 0.1 or 0.2 $M_{\odot}$. This unused mass in the disc must end-up on one or other BD meaning that at least one component won't be a BD anymore…

(Could they form at a few au by core accretion????).

What do discs tell us?

Nothing at the moment:

✪ Ejection (especially liberation) models can give discs (if you see >10 au discs violent ejection has problems).

✪ Core formation may or may not produce discs (we have no idea) and they are probably small as well.

Where do big BD discs come from? Also, where do BD binaries actually come from?