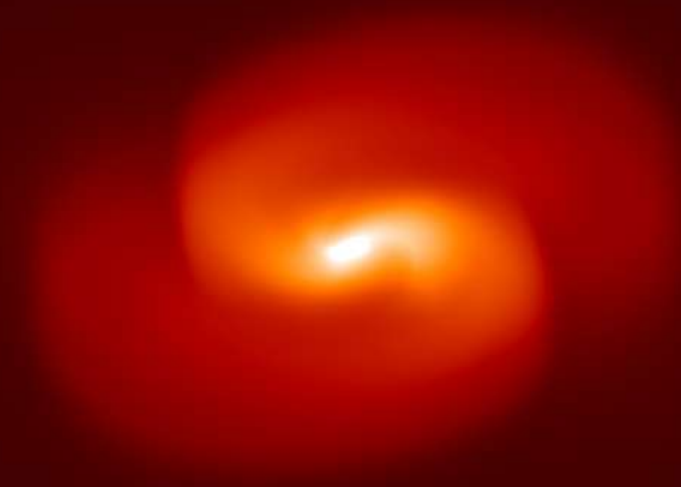
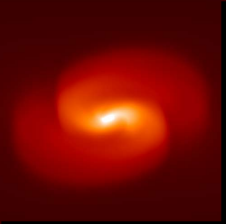


Magnetised dust in star formation: A proposal



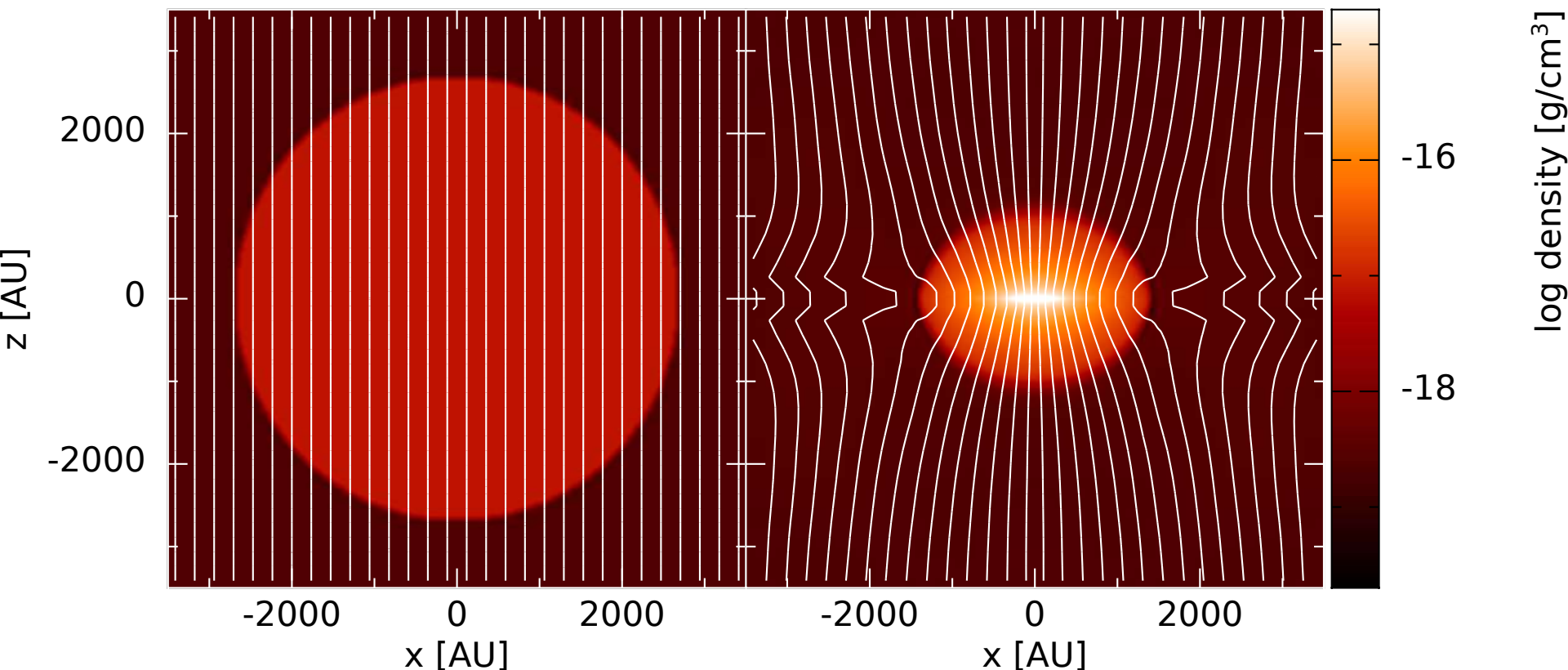
James Wurster

1st European Phantom Users Workshop
University of Milano, 19 June 2018



Magnetic fields in molecular clouds

- Strong field; large-scale structure



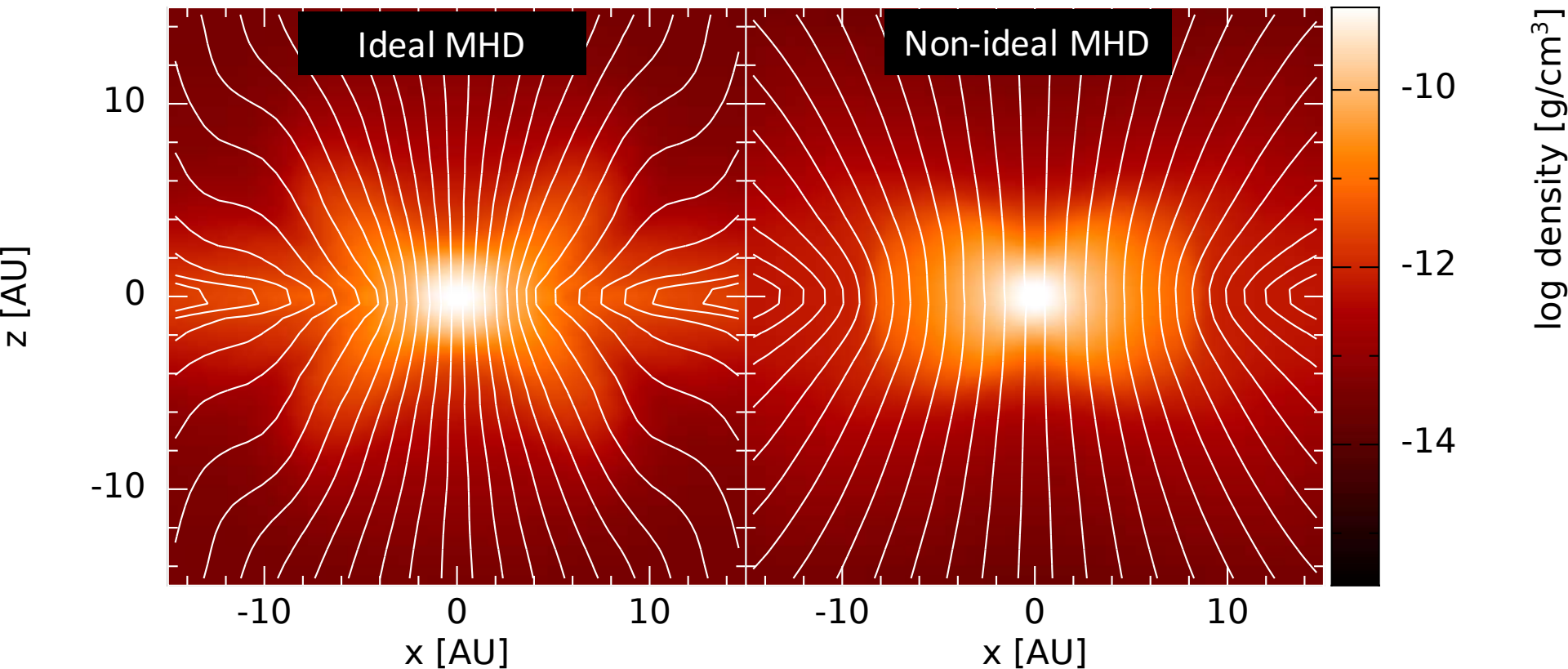
Density (rendered) + Magnetic field lines. Ideal MHD.

Left: Typical (idealised) initial conditions in numerical simulations (collapsing spherical cores).

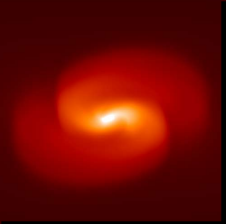
Right: at $\rho_{\text{max}} = 10^{-9} \text{ g cm}^{-3}$

Magnetic fields in molecular clouds

- Strong field; small-scale structure



- Non-ideal MHD includes assumptions about chemical networks and grains
- Grains are assumed to have fixed properties of $a = 0.1 \mu\text{m}$, $\rho_{\text{bulk}} = 3 \text{ g cm}^{-3}$, $f_{\text{dg}} = 0.01$



Disc formation in a magnetised medium

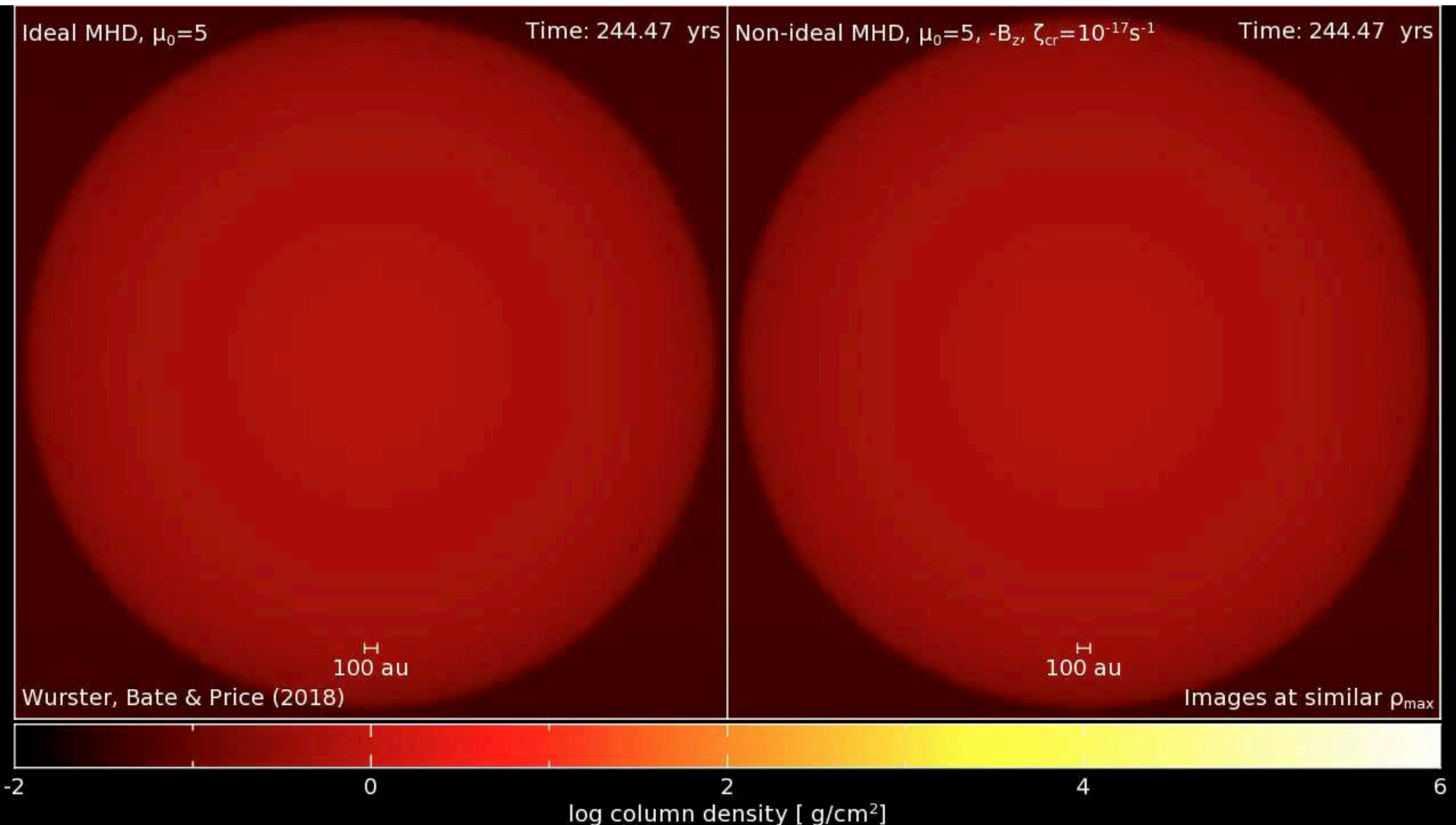
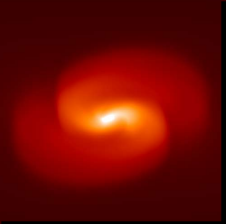
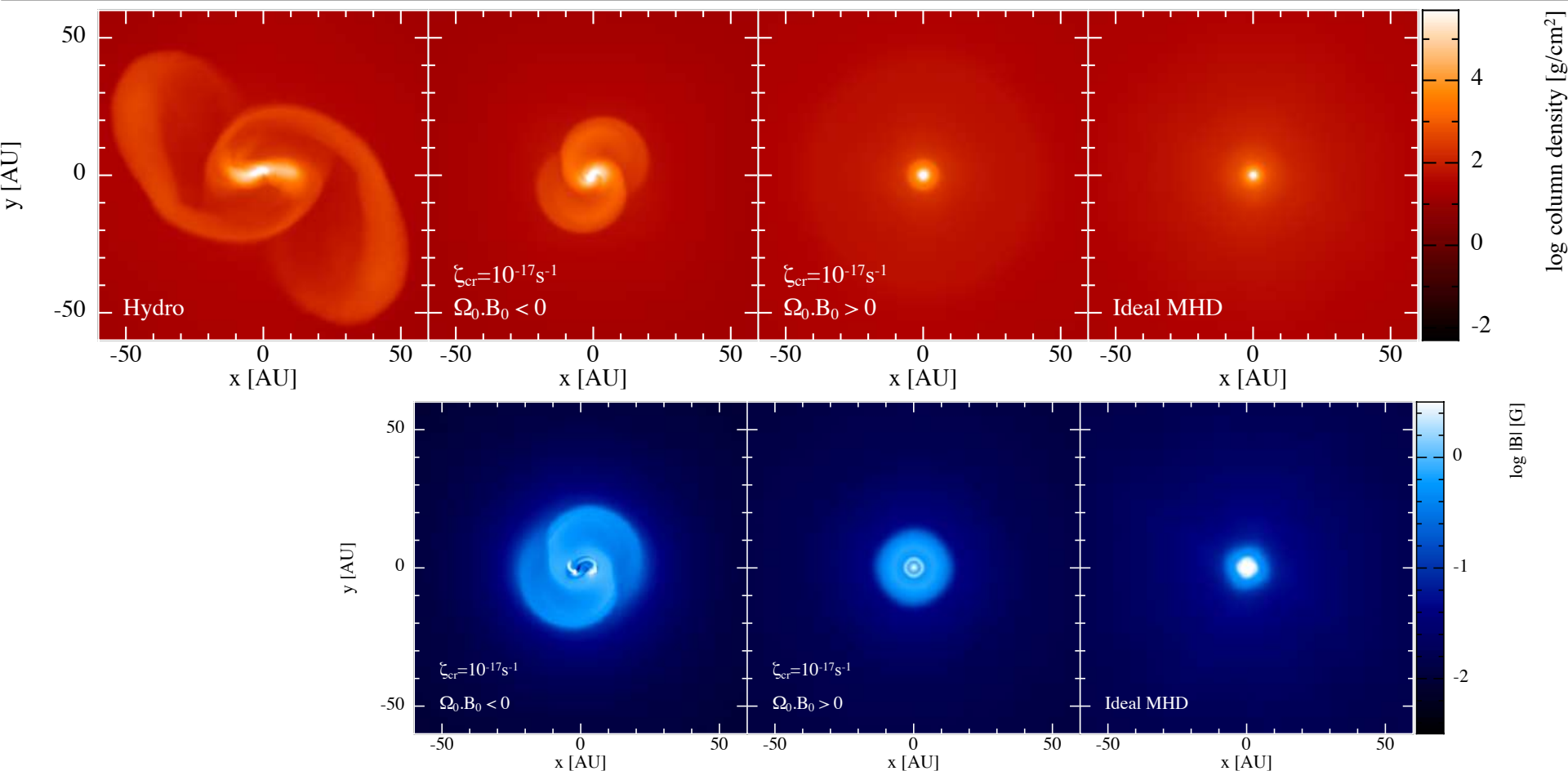


Image is inclined by 30°

Wurster, Bate & Price (submitted); music by Jo-Anne Wurster

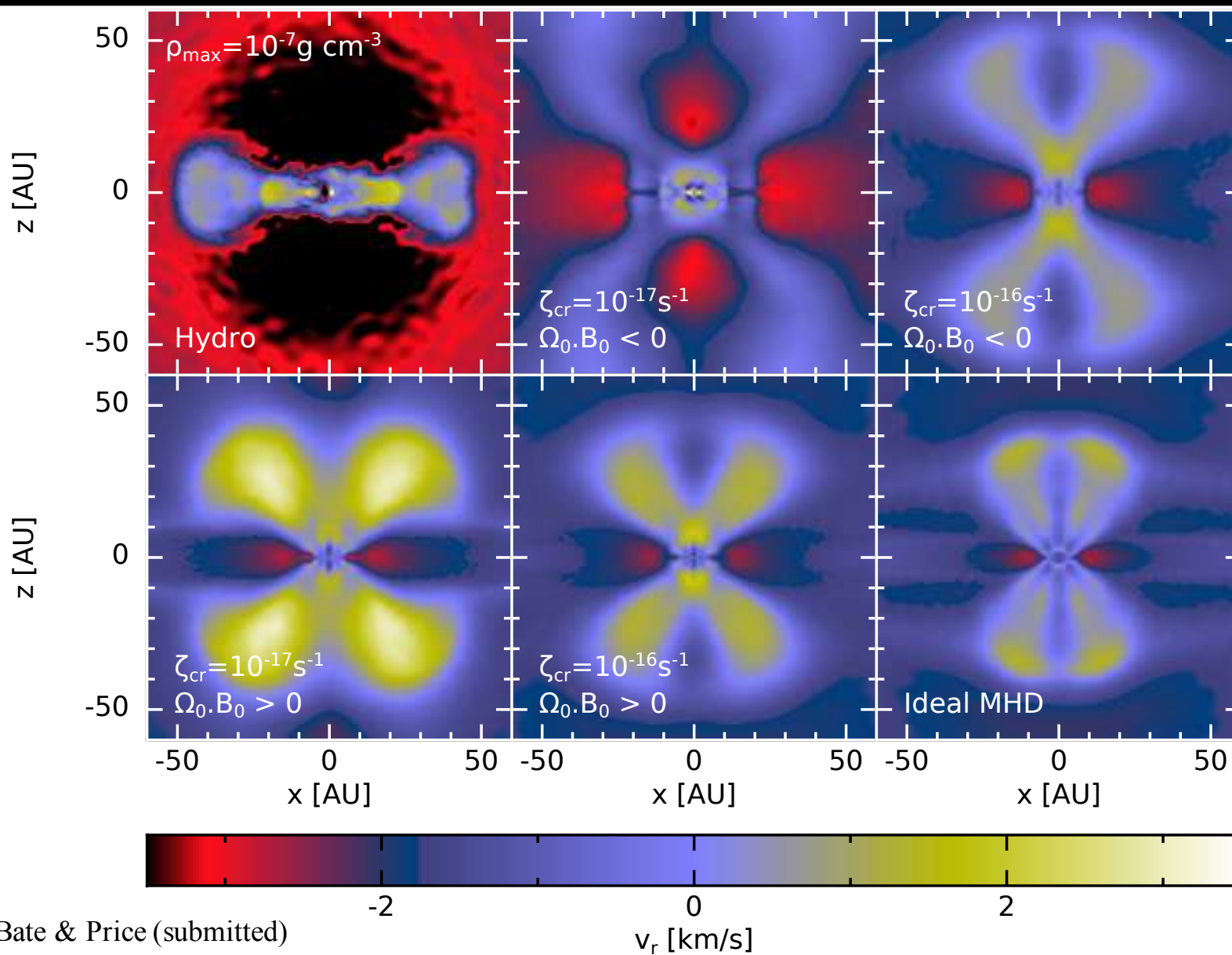


Disc formation in a magnetised medium

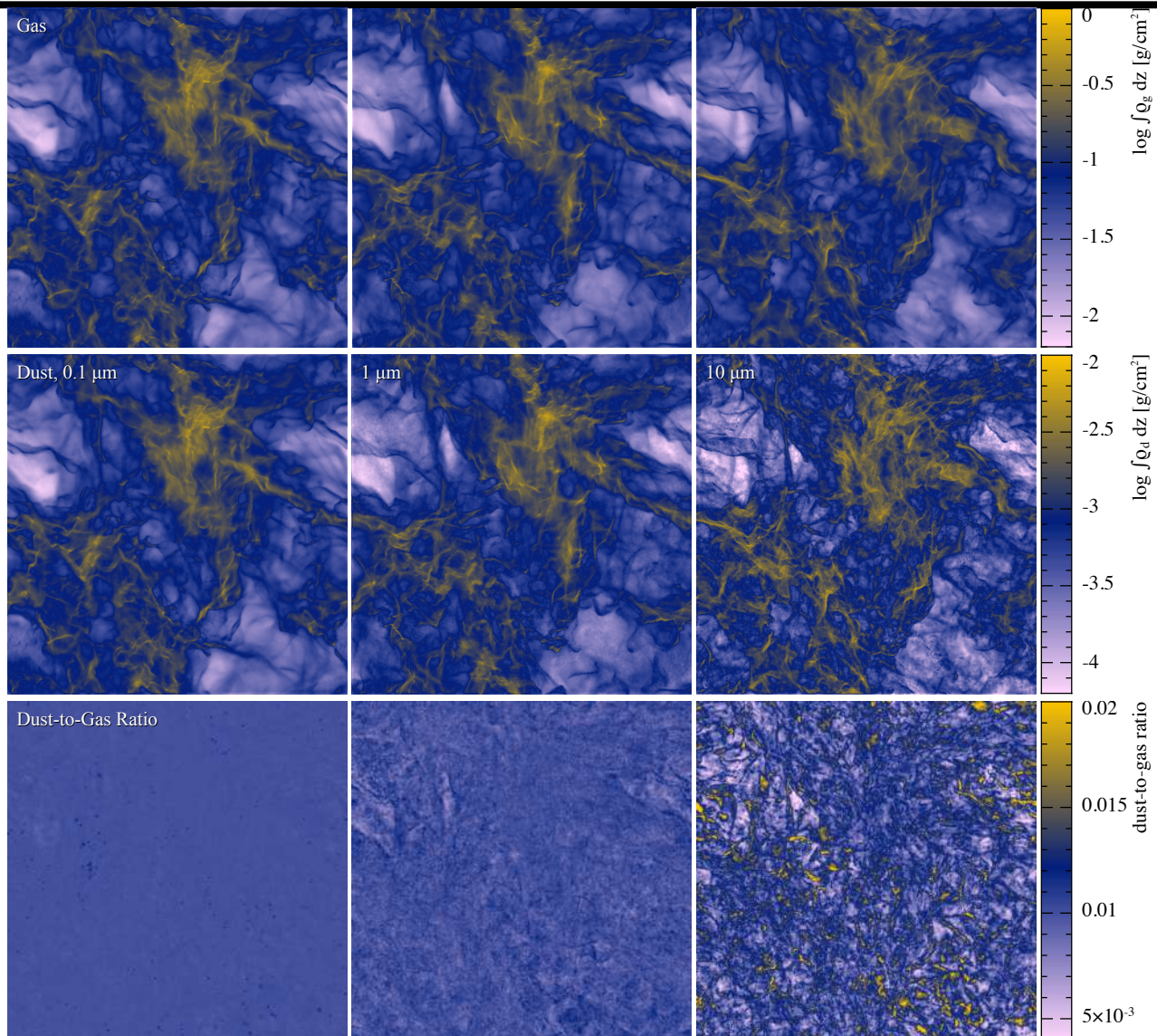


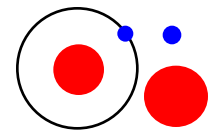


Outflows



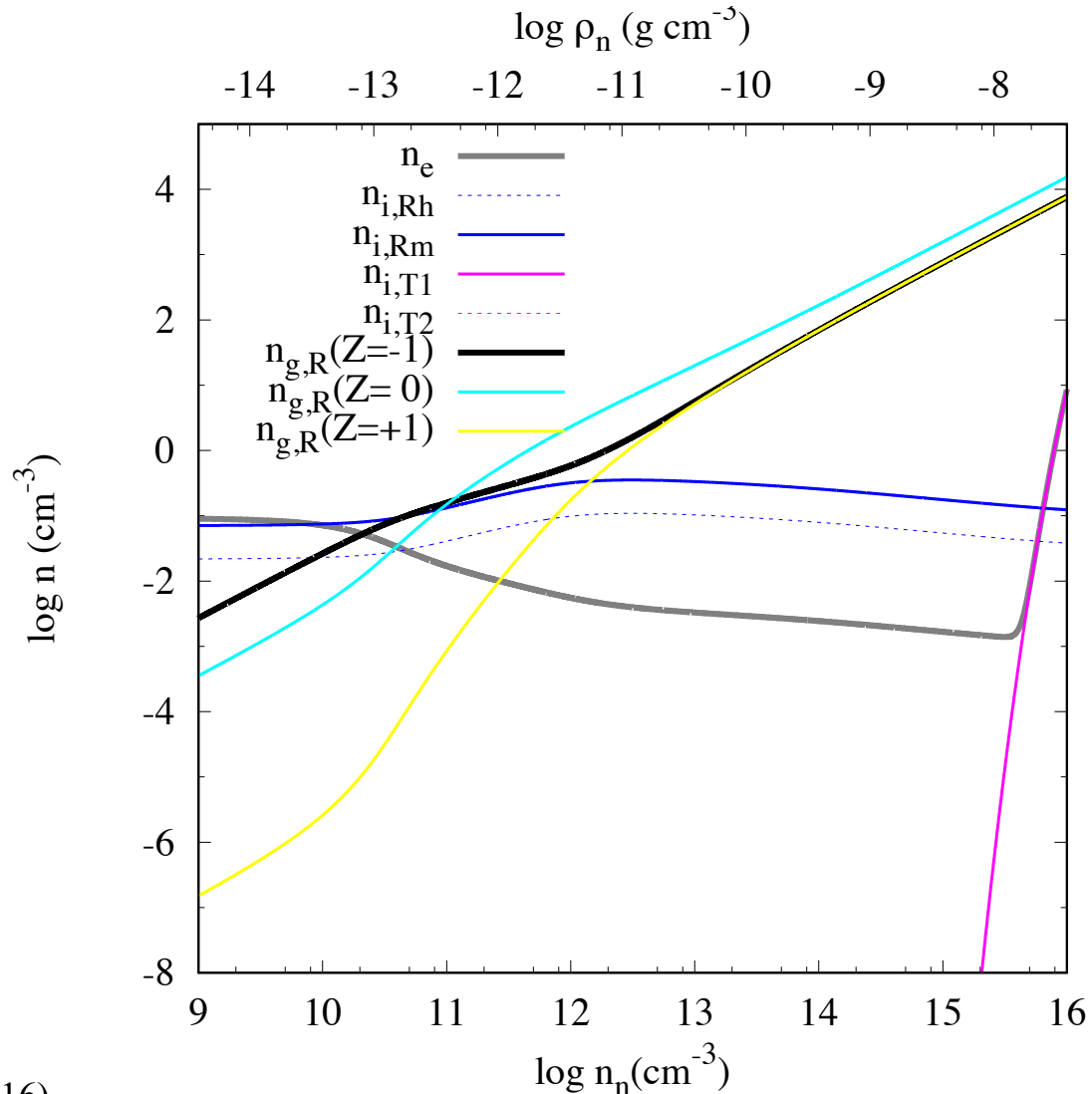
Dust in molecular clouds

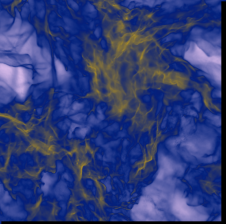




Dust in non-ideal magnetohydrodynamics

➤ Assumes fixed properties of $a = 0.1 \mu\text{m}$, $\rho_{\text{bulk}} = 3 \text{ g cm}^{-3}$, $f_{\text{dg}} = 0.01$





Dust in molecular clouds

➤ The remaining slides contain proprietary information, thus will not be made public. For information, please contact me at j.wurster@exeter.ac.uk

Conclusions

- The conclusions contain propitiatory information which has been redacted.

