

WARPING AWAY GRAVITATIONAL INSTABILITIES IN PROTOPLANETARY DISCS



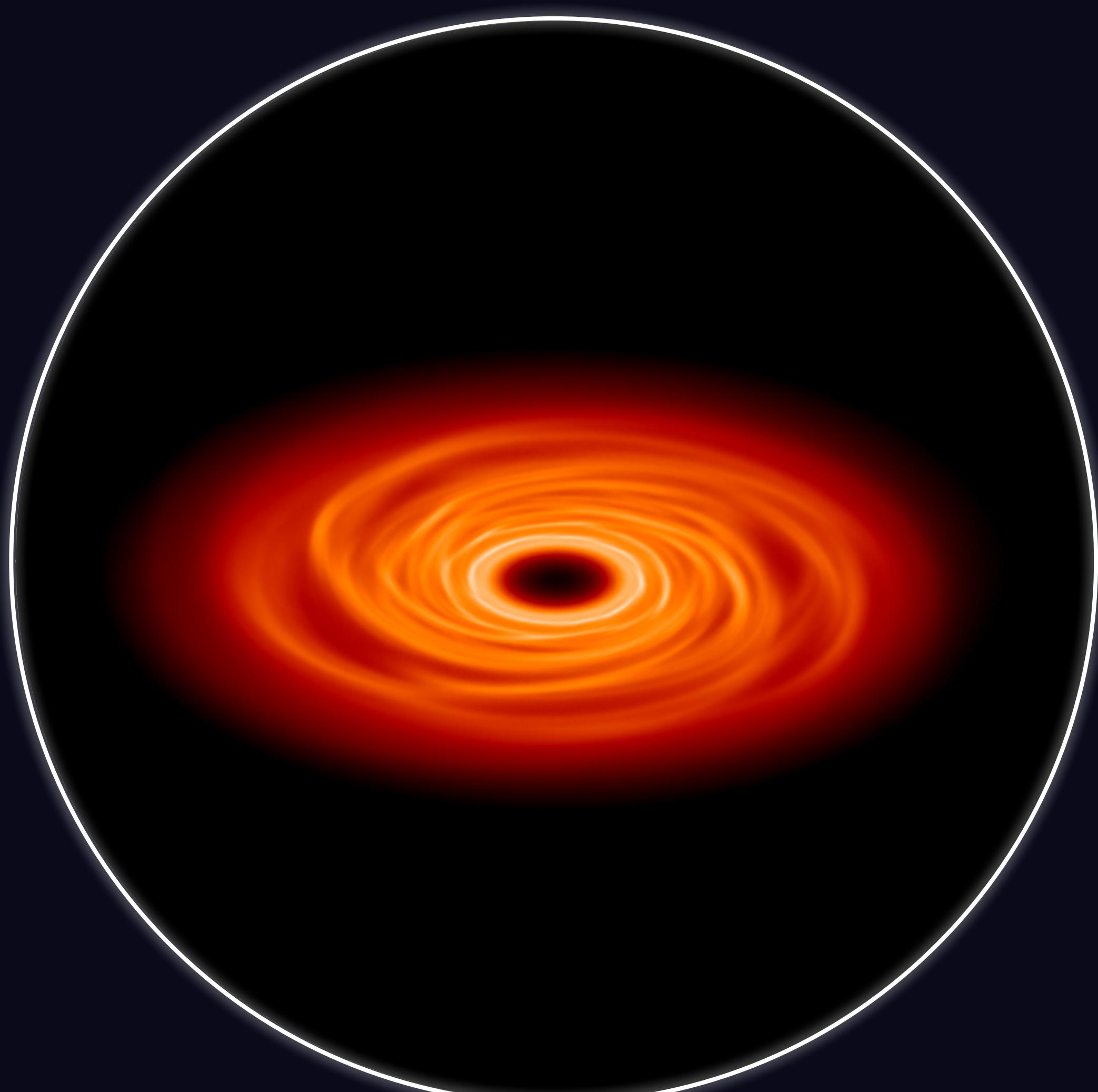
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AIM — Can warps suppress gravitational instabilities in massive discs so that they are more in line with observations?



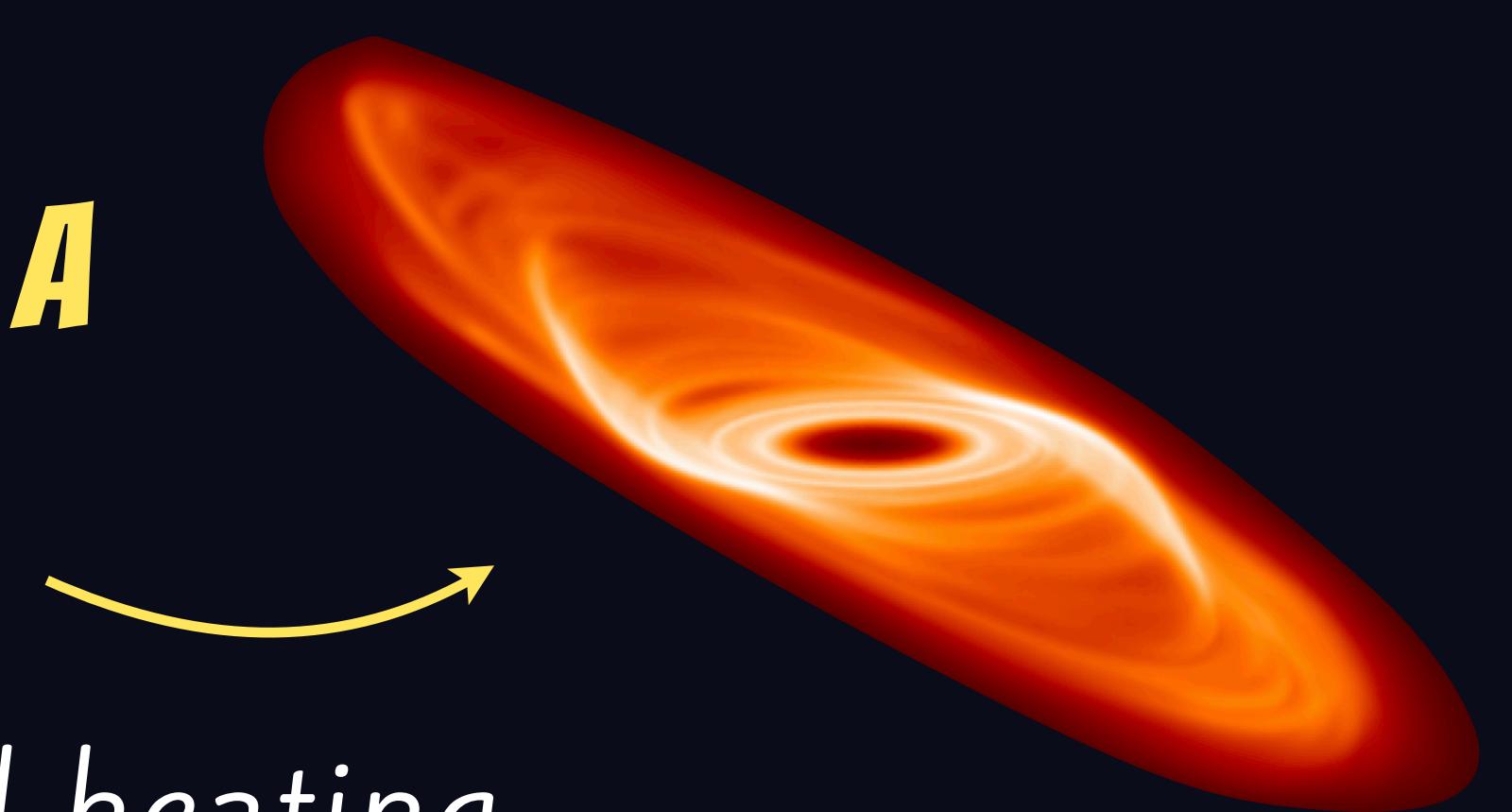
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EVOLUTION OF A FLAT DISC

- The disc remains gravitationally unstable.
- Large scale spiral structures are present throughout the disc.
- This type of substructure is rarely seen in observations.

EVOLUTION OF A WARPED DISC



- The additional heating induced by the warp results in a gravitationally stable disc.
- Results in an axisymmetric disc with ring & gap structure.
- This type of substructure is more commonly seen in observations.

CONCLUSION — Spiral structures due to gravitational instabilities are suppressed by the warp yielding an axisymmetric disc