The reflex instability in protoplanetary discs

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Theoretical studies of protoplanetary discs have a long history, with many works on what instabilities may grow, and how they impact disc evolution and planet formation. By running long-term hydrodynamical simulations of disc-planet interactions, we have recently (and quite unexpectedly!) uncovered what seems to be yet another instability in non-axisymmetric discs. It is a linear instability that takes the form of a growing m=1 mode arising from the reflex motion of the star around the barycentre of the star-disc-planet system, and for this reason we refer to this instability as the reflex instability. It is found with a variety of grid-based codes as well as in smoothed particle hydrodynamics codes, and it is likely relevant to astrophysical discs other than protoplanetary discs. In this communication I will tell you all we currently know and understand about the reflex instability.