On the inner regions of circumstellar discs

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Abstract

Substructures in circumstellar discs can take various shapes such as crescents, gaps, rings, and spirals. Protoplanetary disc substructures have been resolved with high angular resolution observations in the submillimetre and direct imaging in the optical, providing a window in the complexity and diversity of fundamental physical processes in the outer regions of such discs. The inner disc regions, where terrestrial planet formation processes are taking place, are being spatially resolved with current long-baseline optical interferometers. While these observations show asymmetries and are starting to resolve structures in the inner regions of bright, nearby systems, the angular resolution required to relate them to ongoing physical disc processes is not yet available. In this talk, I will open up the discussion on how an 0.1 milliarcsecond angular resolution regime would advance the study the inner regions of circumstellar discs. It will open up avenues of progression on the universality of disc physics by resolving the inner regions of the discs around more abundant lower-mass stars, more distant stars at different stellar evolutionary phases, and even those in our satellite galaxies. The asymmetries that are detected today, could turn out to be multiple ring-like structures where dust is trapped as a result of (sub)stellar companions, or yet unknown physical mechanisms.

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