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UNIVERSITÉ DE GENÈVE
FACULTÉ DES SCIENCES
Département d'astronomie

ASTROPHYSICS SEMINAR

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The dispersal of discs around young stars

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Abstract. Protoplanetary discs are the natural outcome of star formation. They hold the reservoir of material from which planets are formed and hence the timescales of their dispersal sets the timescale for planet formation. The development of theoretical models for the dispersal of protoplanetary discs around young stars has been motivated, for at least ten years, by observations suggesting a rapid transition phase (from disc-bearing to disc-less status) and inside-out dispersal. Infrared photometry from the Spitzer Space Telescope helped cement this view for solar-type stars, while at the same time raising doubts for later types, with claims of discs around M-stars homologously depleting (viscously draining) over significantly longer transition. If this were true it would mean that dispersal (and perhaps also accretion) operates differently in M-stars compared to their solar-type counterparts.

In this talk I will present a tool developed via extensive SED radiative transfer modelling for the classification of the evolutionary status of discs around M-stars using infrared photometry. Using observations of nearby clusters I will argue that, contrary to recent claims, rapid inside-out clearing is the dominant evolutionary path for M-type as well as solar type systems, further motivating the development of dispersal models that satisfy these criteria. I will finally compare and contrast predictions from current dispersal models, including different flavours of photoevaporation (EUV, FUV and X-ray) and planet formation, in the context of available observations of disc fractions in different environments as well as atomic and low-ionisation line diagnostics of hypothetical disc winds. I will conclude that there is strong observational support in favour of X-ray driven photoevaporation as a main dispersal mechanism and discuss the implications on the evolution of star-disc systems, their accretion properties and planet-making potential.

Additional Information

The seminars are given in the ISDC "Pavillon" building
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