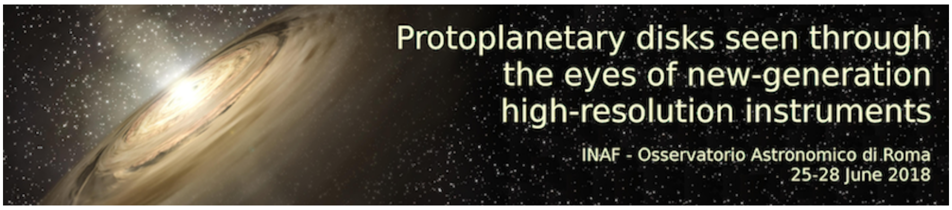

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Can spirals and axisymmetric structures give us a proxy for the total disc mass? The case of HD135344B

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In recent years, the Atacama Large millimeter/submillimter Array (ALMA) and the Spectro-Polarimetric High-contrast Exoplanet Research (SPHERE) instrument at the VLT have given us high resolution and high sensitivity observations of protoplanetary discs, showing peculiar substructures, such as spirals, gaps and horseshoes. Disc instabilities and planets have been proposed to be responsible for their formation, but their origin is still very debated, in particular how their shape depends on the disc mass.
I will present the results of our hydrodynamical modeling of the protoplanetary disc HD135344B (Garufi et al. 2013, van der Marel et al. 2016, Stolker et al. 2016, Maire et al. 2017), that shows a distinctive spiral structure in scattered light and an axisymmetric horseshoe in the dust continuum. We performed hydrodynamical simulations (PHANTOM, SPH code by Price et al., 2017) and Monte Carlo Radiative Transfer simulations (RADMC-3D, by Dullemond et al. 2012) of a protoplanetary disc with two embedded planets, varying the total gas mass and the aspect ratio (H/R) of the disc. We found that the spiral structure, observed in scattered light, is well reproduced by a massive planet in the outer region of the disc. However, it is still not completely clear if the horseshoes like structure seen in the mm continuum images is due to the same outer planet.
Furthermore, I will present preliminary results in order to find if it is possible to estimate the total disc mass in protoplanetary discs by the combined hydrodynamical modeling of planet-induced disc substructures observed in scattered light (micron-sized grains) and in the dust continuum (mm-sized grains). To pursue this aim, we are performing SPH simulations of a protoplanetary disc with two embedded planets, varying the gas mass component.

Primary authors: VERONESI, Benedetta (Università degli Studi di Milano); LODATO, Giuseppe (Università degli Studi di Milano); DIPIERRO, Giovanni (University of Leicester); PRICE, Daniel J. (Monash University)

Presenter: VERONESI, Benedetta (Università degli Studi di Milano)

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