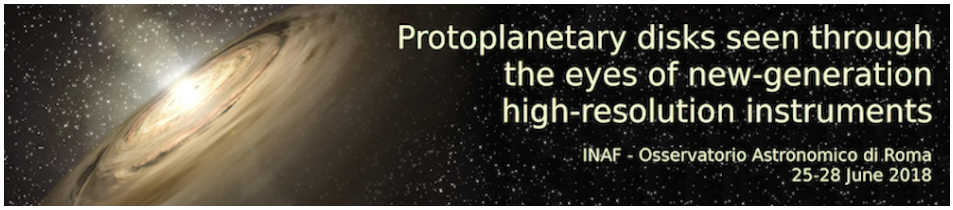

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The gas and dust disk around the CQ Tau protostar

The combination of high resolution and sensitivity offered by the Atacama Large Millimeter Array (ALMA) is transforming our understanding of protoplanetary disks, as their bulk gas and dust distributions can be studied independently. I will present resolved ALMA observations of the continuum ($\lambda = 1.3$ mm) and CO isotopologues (^{12}CO, ^{13}CO, C^{18}O $J = 2 - 1$) line emission from the disk around the nearby ($d = 160$ pc), intermediate mass (M=1.5M$_\odot$) pre-main-sequence star, CQ Tau. Our focus is on finding the best representative model for the high-angular resolution observations of the protoplanetary disk around CQ Tau. For the data analysis we employ the physical-chemical code DALI, which self-consistently calculate the disk chemical structure, together with the disk gas and dust thermal structure. The aim is to characterize the dust and gas radial distributions. In particular, it is interesting to constraint the depth and extent of the inner cavity in both components, as this provides information on the possible planet clearing the inner disk.
We find clear evidence of an inner cavity in the disk dust distribution with an outer radius of 28 AU. The dust depletion factor inside the cavity is of 10^{-2}. The gas distribution presents a smaller cavity, with outer radius between 15 AU and 25 AU, and a depletion factor between 10^{-1} and 10^{-3}. We combine this study with hydrodynamical simulation in order to probe if the gas and dust distribution that we see can be compatible with the presence of a planet. Those simulations gave us also constraints on the mass and distance of the possible companion.

Primary author: UBEIRA GABELLINI, Maria Giulia (INAF)

Presenter: UBEIRA GABELLINI, Maria Giulia (INAF)

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