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Converging filaments and the formation of a super star cluster in SgrB2

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Contributed talk

Abstract:
"The star formation process is intimately related to the existence of disks, which mediate the accretion onto the star, and energetic outflows, which help to remove angular momentum from the system. Over the last years, this paradigm has been widely favoured for stars of all masses: from low-mass through B-type stars up to the most massive O-type stars. However, for O-type stars (L > 10^5 Lsun, M_star > 20 Msun) there is still less than a handful clear cut cases of detected disks. We have used ALMA to search for disk candidates around O-type protostars. Observations of six regions at a resolution of 0.2 arcsec provided us with evidence of three possible rotating disks. In this poster we present the results for G29.96-0.02, a well-known high-mass star-forming region for which rotating structures were claimed in the past. Our 0.2-arcsec resolution ALMA observations reveal a new and interesting scenario where the disk is not what it was thought to be, and an energetic and collimated outflow plays a dominant role. The observational findings are consistent with the existence of non-isotropic and non-steady accretion as seen in numerical simulations. This irregular accretion onto the massive disk has a profound impact by changing the disk plane orientation. This, in turn, modifies the orientation of the outflow which disrupts the outer parts of the disk. Under these circumstances, dense gas originally associated with the disk is pushed away by the outflow. This is observed in G29.96-0.02, where the spatial distribution and velocity field of complex organic molecules such as CH3CN or CH3CH2CN - typically found tracing the dense gas disk in massive stars - appear tracing the base of the outflow. Complementing this, we find evidence for a possible compact disk (600 au in size) perpendicular to the current outflow axis. All together, G29.96-0.02 seems to constitute a unique case of a (truncated) disk around an O-type protostar, caught in the act of being disrupted by anisotropic accretion."

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