DISKS SURVIVAL IN THE EXTREMELY MASSIVE CLUSTERS CYGNUS OB2

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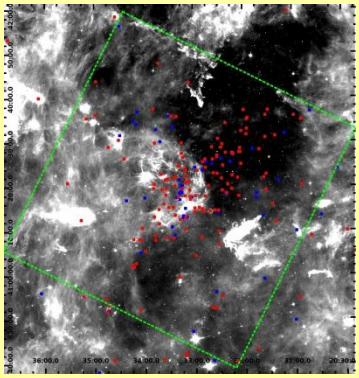
ABSTRACT

Cygnus OB2, in the Cygnus X region at the distance of 1450pc[1], is the closest massive star forming region to the Sun, hosting hundreds of OB stars[2] and an unique target to study star formation close to OB star. CygOB2 has been recently surveyed with Chandra/ACIS-I (the Chandra Cygnus OB2 Legacy Survey, PI: Drake) and GTC/OSIRIS (FoV ~1°×1°, PI: Garcia). This data are merged with catalogs from SDSS-DR8, IPHAS, 2MASS-PSC, UKIDSS and Spitzer[3] to classify cluster members down to 0.2 $M_{\odot}$ and study how OB stars affect their early evolution.



Data

8.0μm image of CygOB2 with: Chandra field (dashed line), O stars (blue dots) and the B stars (red dots)

Members selection

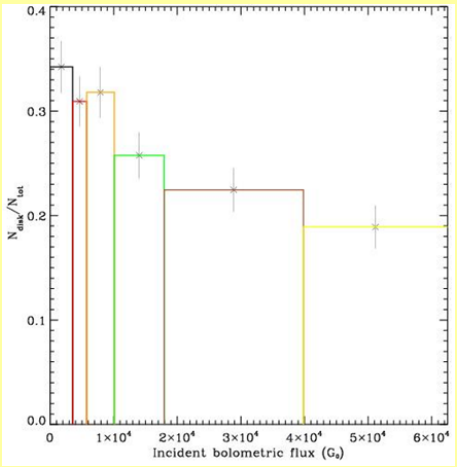
- Disk-bearing: from various infrared diagrams and after a accurate selection of candidate contaminants. See table:

Stars with disks	Giants	Galaxies	Foreground objects
$J-H$ vs. $H-K$	[3.6]-[4.5] vs. [5.8]-[8.0]	[3.6]-[4.5] vs. [5.8]-[8.0]	r' vs. $r'-i'$
[3.6] – [5.8] vs. [4.5] – [8.0]	[3.6] – [5.8] vs. [4.5] – [8.0]	[4.5] – [5.8] vs. [5.8] – [8.0]	$r'-i'$ vs. $i'-z'$
[4.5] vs. [4.5] – [8.0]	[4.5] vs. [4.5]-[8.0]	[3.6]-[5.8] vs. [4.5]-[8.0]	J vs. $J-K$
[3.6] vs. [3.6] – [24.0]	[8.0] vs. [4.5]-[8.0]	[4.5] vs. [4.5]-[8.0]	
[24.0] vs. [8.0] – [24.0]	K-[3.6] vs. [3.6]-[4.5]	[24.0] vs. [8.0]-[24.0]	
[24.0] vs. [4.5] – [8.0]	[24.0] vs. [8.0]-[24.0]	[24.0] vs. [4.5]-[8.0]	
[4.5] – [5.8] vs. [5.8] – [24.0]	[24.0] vs. [4.5]-[8.0]		
Q indices	[4.5]-[5.8] vs. [5.8]-[24.0]		
	Q indices		

- Disk-less: optical sources with X-ray counterpart and optical colors compatible with the cluster

Disk photoevaporation in CygOB2

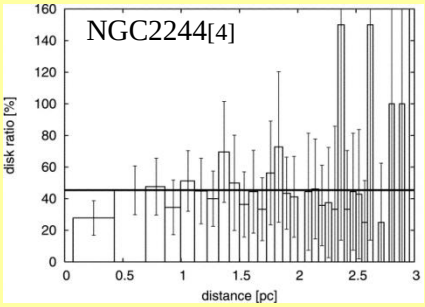
Disk fraction decreases with the intensity of the UV local field across the entire studied region:

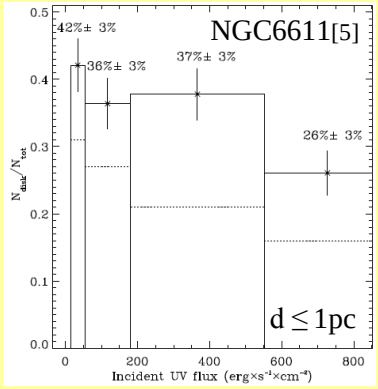


In CygOB2 disks experience effects due to OB stars for larger distances than the other known clusters, being a harsh environment for disks evolution

Disks photoevaporation in other clusters

Disk fraction decreases only very close to the ionizing sources:





Proplyds

- *Orion*: proplyds, d < 0.5pc from O6V star [6]
- *M20*: 1 proplyd, d=3e4 AU from O7.5III [7]
- *M8*: proplyd, d=0.024 pc from O7V star [8]
- *NGC3603*: 3 proplyds, d< 2pc from large population of O stars [9]
- *Carina*: several candidate proplyds at various distances from O stars [10]
- *NGC2244*: proplyd, d=0.22 from O5V star [11]
- *IC1396*: 1 proplyd, d=0.21 from O6V star [11]
- *NGC2264*: 1 proplyd, d=0.12 from O7V star [11]
- *W5*: 4 proplyd, d < 0.67 pc from O7V star [12]
- ***CygOB2*, proplyd-like protostars, d < 14 pc from central cluster** [13]

References: [1] Hanson 2003; [2] Comeron+ 2002; [3] Kraemer+ 2010; [4] Balog+ 2007; [5] Guarcello+ 2010; [6] O'Dell+ 1994; [7] Yusef-Zadeh+ 2005; [8] Strecklum+ 1998; [9] Brandner+ 2000; [10] Smith+ 2003; [11] Balog+ 2006; [12] Koenig+ 2008; [13] Wright+ 2012