

# Story, Layout and Color

# Tell a story with a message!

**Not in the way you found it  
but in the way your  
audience can find it**

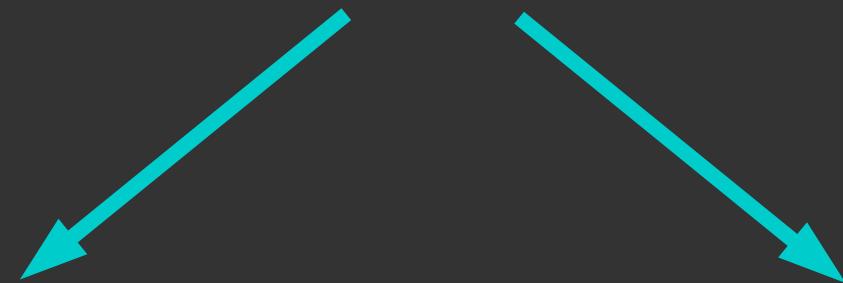
# The story's message

- 3 bullet point rule
- Short sentences & key words
- Use Color to highlight

# Consistency

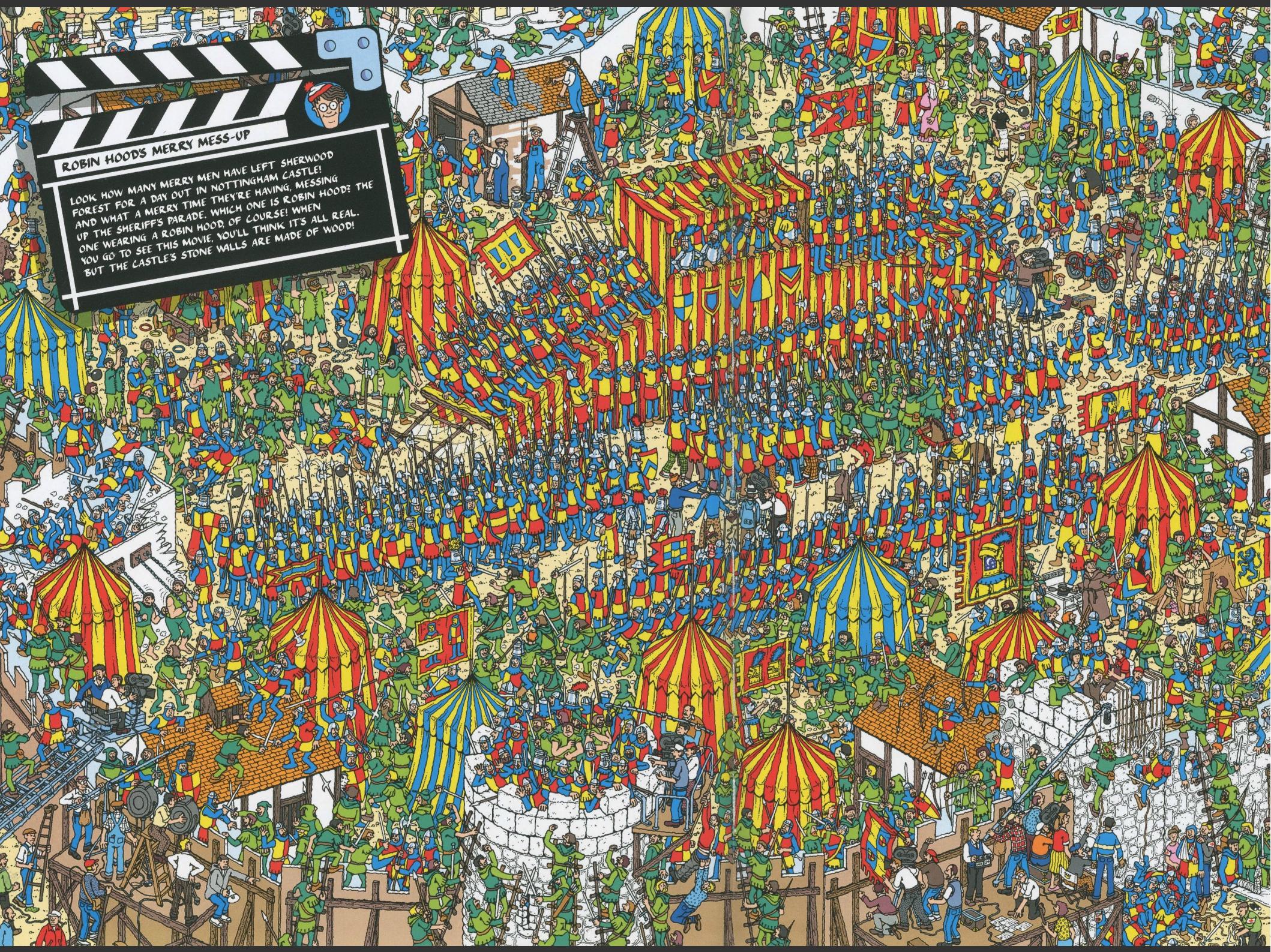


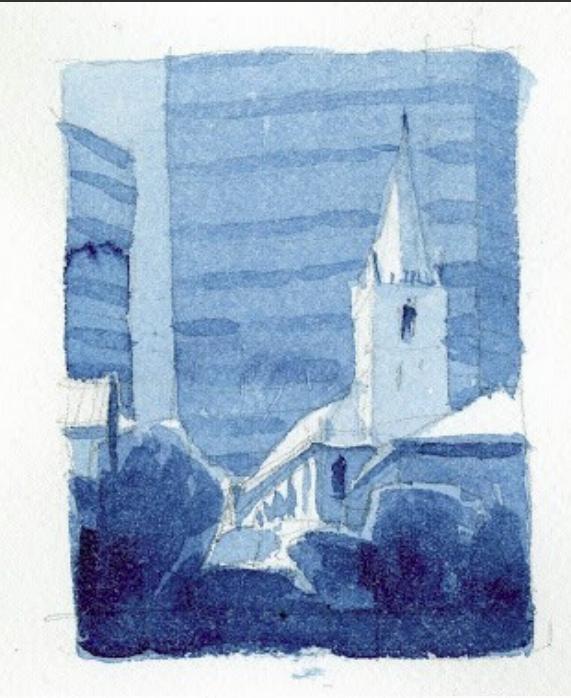
## Story



## Layout

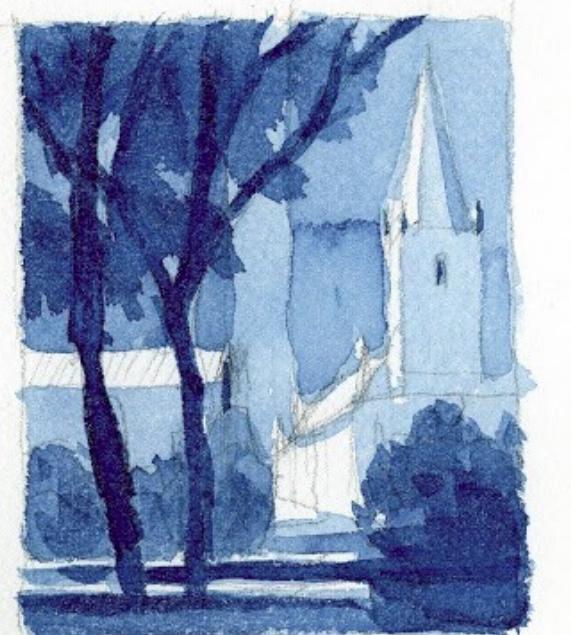
## Color





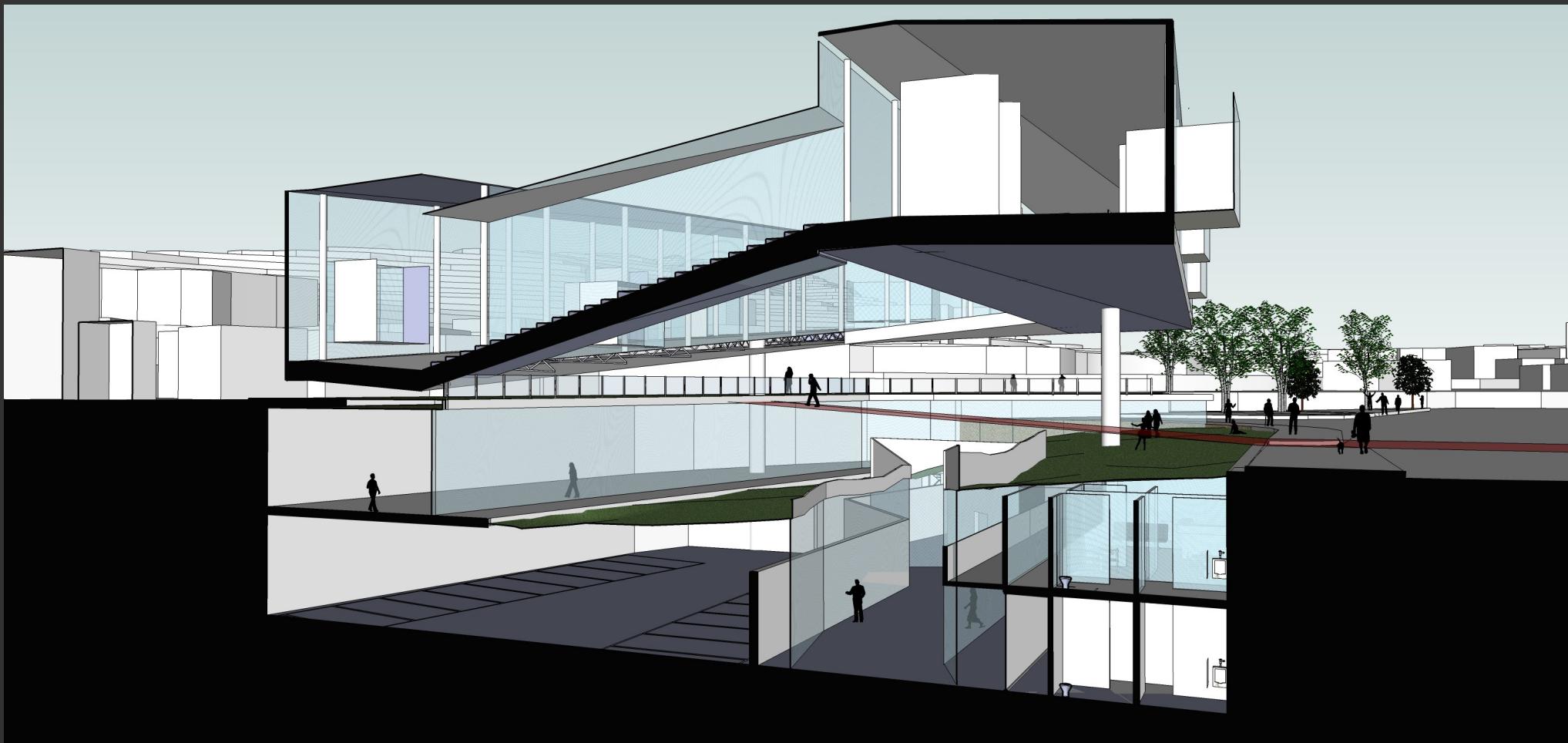
# Does the layout relate the message?

- Clear, visible, up front
- Readable in few sec.
- Keywords highlight the message (or give it context)



Stephanie Bower:  
urbansketchers.org

# Less is more

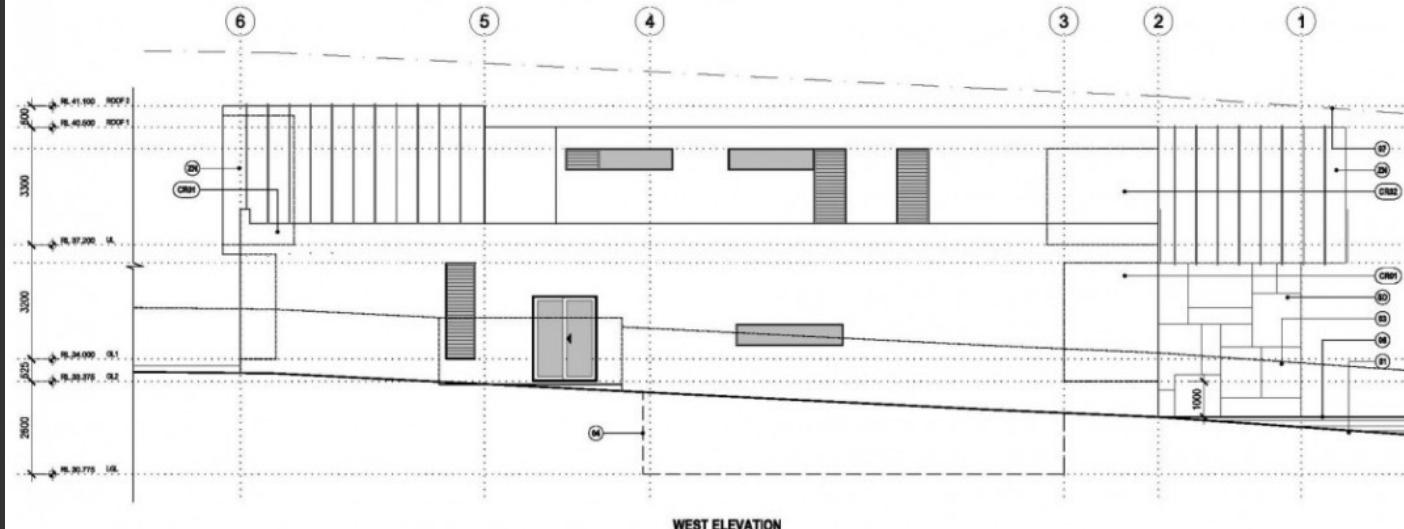


Minu Lee: Sectional perspective of library in Seoul, Korea  
url: [unswbe.wordpress.com](http://unswbe.wordpress.com)

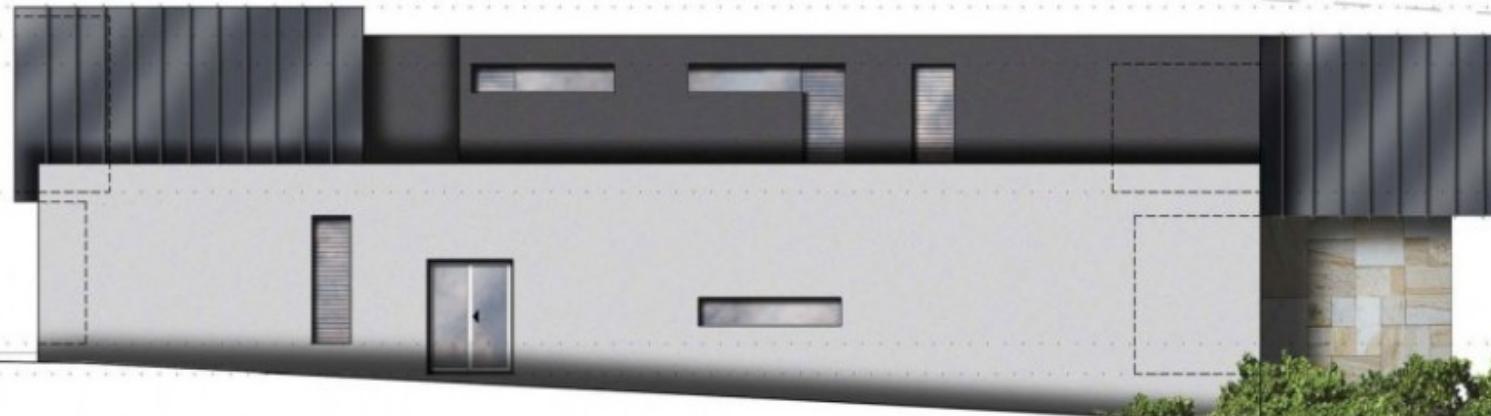
**LEGEND & ABBREVIATION**

CR01 cement rendered & point - Reserve Concrete  
 CR02 cement rendered & point - Reserve Gravel  
 GS thermal insulation blanket  
 NC non-combustible  
 TC weathered red cedar paneling  
 ZH zinc cladding

01 line of natural ground level @ boundary  
 02 line of finished ground level @ building face  
 03 line of firebrick/masonry wall @ boundary  
 04 line of roof beyond  
 05 line of roof level  
 06 timber retaining wall to landscaped courtyard  
 07 maximum 8m building height



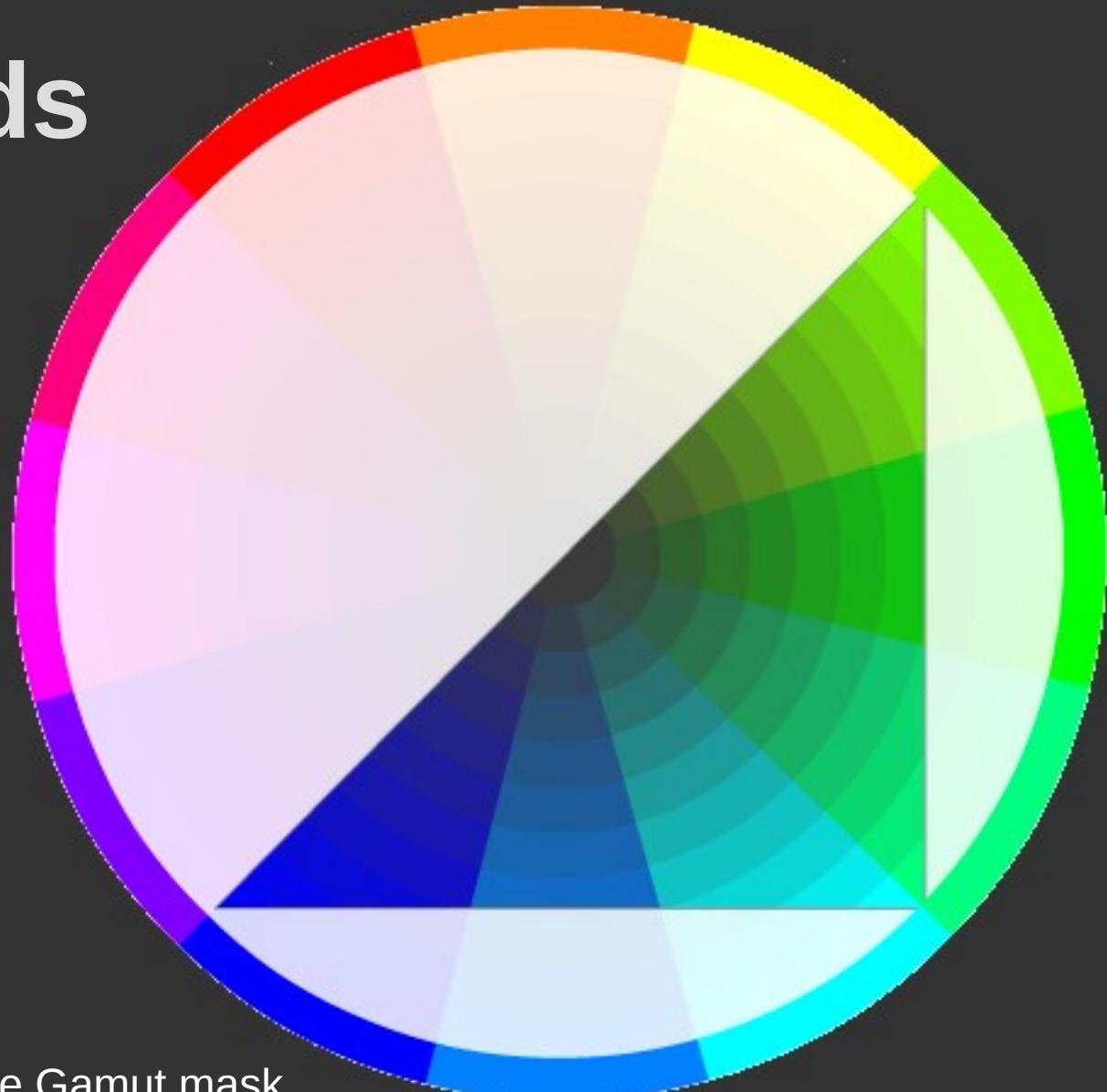
**WEST ELEVATION**



Modern Box House, Sydney, Australia  
 url: [bravity.net](http://bravity.net)

# Color: Gamut masking

- Color > words  
(sometimes)
- Limit color palette
- Not always applicable



The Gamut mask  
[livepaintinglessons.com/gamutmask.php](http://livepaintinglessons.com/gamutmask.php)

# Color and message

- Color needs to match message
- Connections & consistency

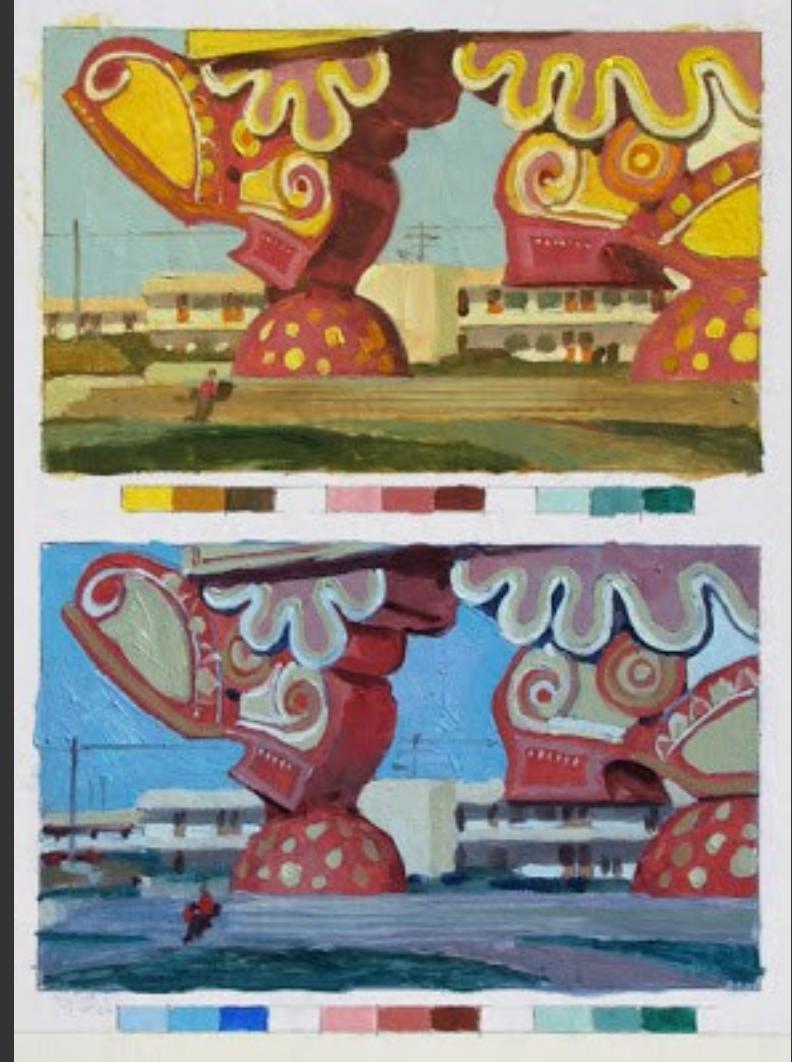
James Gurney  
Colors in Lord of the Rings  
[gurneyjourney.blogspot.nl](http://gurneyjourney.blogspot.nl)



# Color can change the message



James Gurney  
Gamut Masking Method  
[gurneyjourney.blogspot.nl](http://gurneyjourney.blogspot.nl)

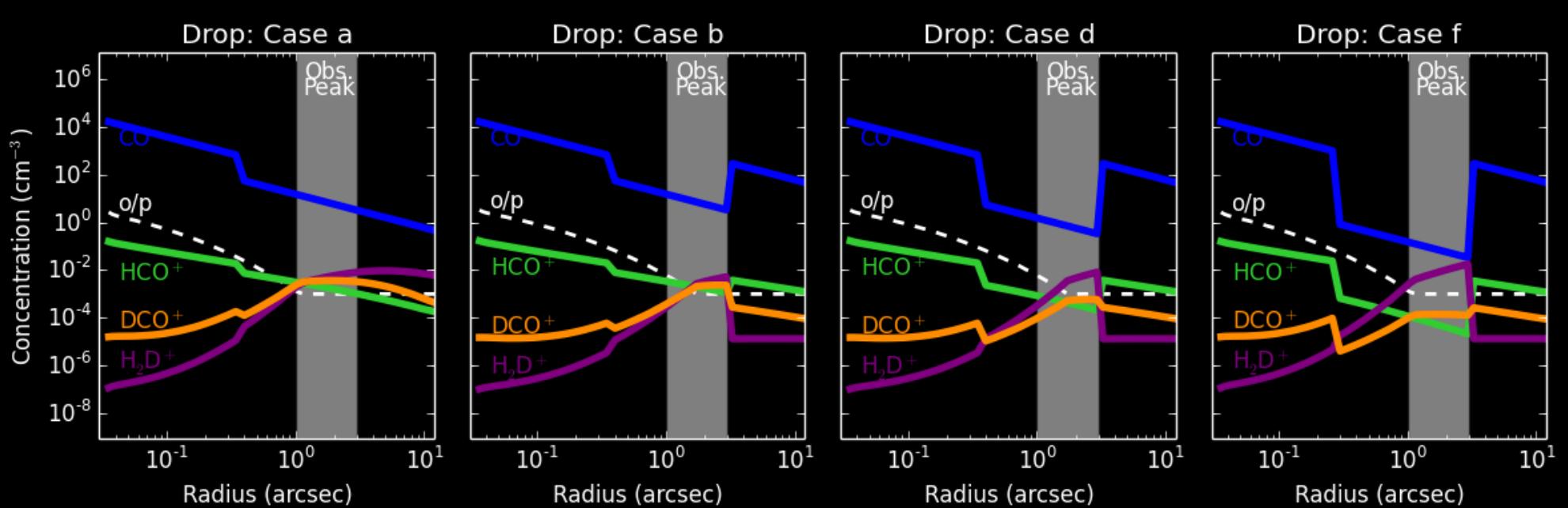
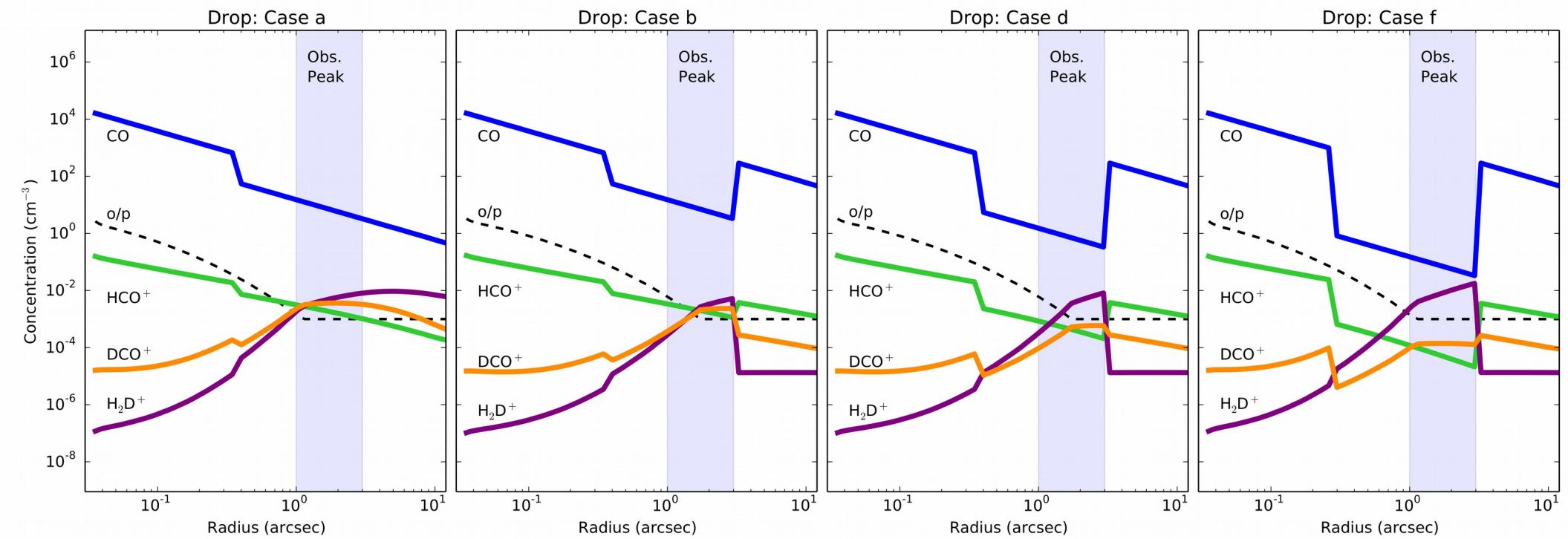


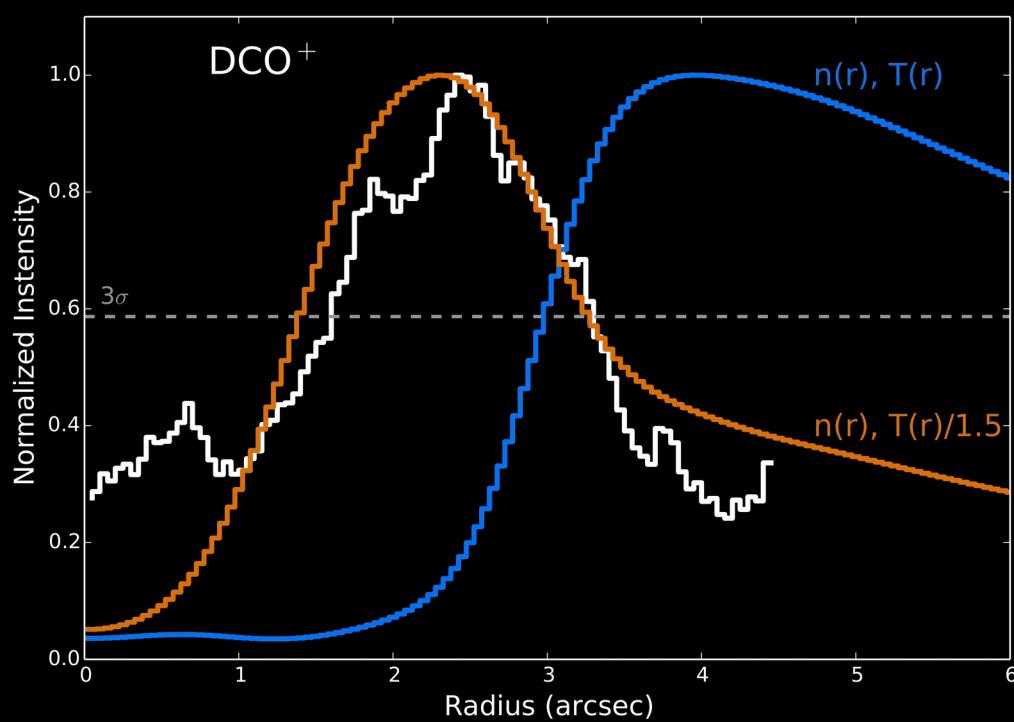
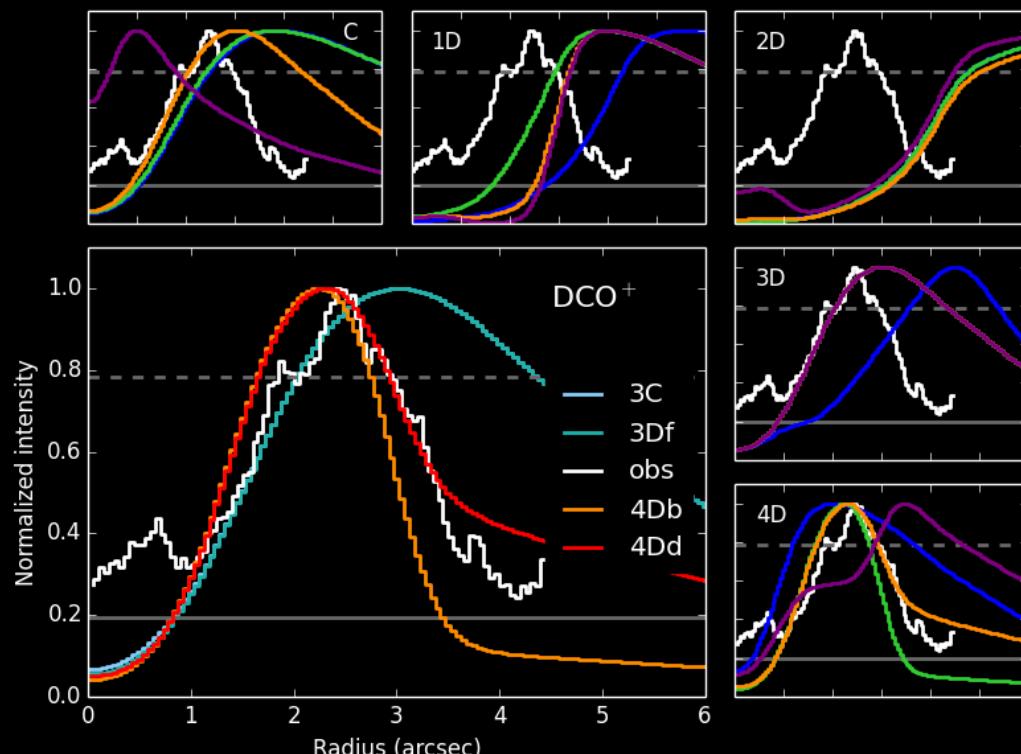
Red colors			Green colors			Brown colors		
IndianRed	CD 5C 5C	205 92 92	GreenYellow	AD FF 2F	173 255 47	Cornsilk	FF F8 DC	255 248 220
LightCoral	F0 80 80	240 128 128	Chartreuse	7F FF 00	127 255 0	BlanchedAlmond	FF EB CD	255 235 205
Salmon	FA 80 72	250 128 114	LawnGreen	7C FC 00	124 252 0	Bisque	FF E4 C4	255 228 196
DarkSalmon	E9 96 7A	233 150 122	Lime	00 FF 00	0 255 0	NavajoWhite	FF DE AD	255 222 173
LightSalmon	FF A0 7A	255 160 122	LimeGreen	32 CD 32	50 205 50	Wheat	F5 DE B3	245 222 179
Crimson	DC 14 3C	220 20 60	PaleGreen	98 FB 98	152 251 152	BurlyWood	DE B8 87	222 184 135
Red	FF 00 00	255 0 0	LightGreen	90 EE 90	144 238 144	Tan	D2 B4 8C	210 180 140
FireBrick	B2 22 22	178 34 34	MediumSpringGreen	00 FA 9A	0 250 154	RosyBrown	BC 8F 8F	188 143 143
DarkRed	8B 00 00	139 0 0	SpringGreen	00 FF 7B	0 255 127	SandyBrown	F4 A4 60	244 164 96
Pink colors			MediumSeaGreen	3C B3 71	60 179 113	Goldenrod	DA A5 20	218 165 32
Pink	FF C0 CB	255 192 203	SeaGreen	2E 8D 57	46 139 87	DarkGoldenrod	BB 86 0B	184 134 11
LightPink	FF B6 C1	255 182 193	ForestGreen	22 8B 22	34 139 34	Peru	CD 85 3F	205 133 63
HotPink	FF 69 B4	255 105 180	Green	00 80 00	0 128 0	Chocolate	D2 69 1E	210 105 30
DeepPink	FF 14 93	255 20 147	DarkGreen	00 64 00	0 100 0	SaddleBrown	8B 45 13	139 69 19
MediumVioletRed	C7 15 85	199 21 133	YellowGreen	9A CD 32	154 205 50	Sienna	A0 52 2D	160 82 45
PaleVioletRed	DB 70 93	219 112 147	OliveDrab	6B 8E 23	107 142 35	Brown	A5 2A 2A	165 42 42
Orange colors			Olive	80 80 00	128 128 0	Maroon	80 00 00	128 0 0
LightSalmon	FF A0 7A	255 160 122	DarkOliveGreen	55 6B 2F	85 107 47	White colors		
Coral	FF 7F 50	255 127 80	MediumAquamarine	66 CD AA	102 205 170	White	FF FF FF	255 255 255
Tomato	FF 63 47	255 99 71	DarkSeaGreen	8F BC 8F	143 188 143	Snow	FF FA FA	255 250 250
OrangeRed	FF 45 00	255 69 0	LightSeaGreen	20 B2 AA	32 178 170	Honeydew	F0 FF F0	240 255 240
DarkOrange	FF 8C 00	255 140 0	DarkCyan	00 BB BB	0 139 139	MintCream	F5 FF FA	245 255 250
Orange	FF A5 00	255 165 0	Teal	00 80 80	0 128 128	Azure	F0 FF FF	240 255 255
Yellow colors			Blue/Cyan colors			AliceBlue	F0 F8 FF	240 248 255
Gold	FF D7 00	255 215 0	Aqua	00 FF FF	0 255 255	GhostWhite	F8 F8 FF	248 248 255
Yellow	FF FF 00	255 255 0	Cyan	00 FF FF	0 255 255	WhiteSmoke	F5 F5 F5	245 245 245
LightYellow	FF FF E0	255 255 224	LightCyan	E0 FF FF	224 255 255	Seashell	FF F5 EE	255 245 238
LemonChiffon	FF FA CD	255 250 205	PaleTurquoise	AF EE EE	175 238 238	Beige	F5 F5 DC	245 245 220
LightGoldenrodYellow	FA FA D2	250 250 210	Aquamarine	7F FF D4	127 255 212	OldLace	FD F5 E6	253 245 230
PapayaWhip	FF EF D5	255 239 213	Turquoise	40 E0 DD	64 224 208	FloralWhite	FF FA F0	255 250 240
Moccasin	FF E4 B5	255 228 181	MediumTurquoise	48 D1 CC	72 209 204	Ivory	FF FF F0	255 255 240
PeachPuff	FF DA B9	255 218 185	DarkTurquoise	00 CB D1	0 206 205	AntiqueWhite	FA EB D7	250 235 215
PaleGoldenrod	EE E8 AA	238 232 170	CadetBlue	5F 9E A0	95 158 160	Linen	FA F0 E6	250 240 230
Khaki	F0 E6 8C	240 230 140	SteelBlue	46 82 B4	70 130 180	LavenderBlush	FF F0 F5	255 240 245
DarkKhaki	BD B7 6B	189 183 107	LightSteelBlue	B0 C4 DE	176 196 222	MistyRose	FF E4 E1	255 228 225
Purple colors			PowderBlue	B0 E0 E6	176 224 230	Gray colors		
Lavender	E6 E6 FA	230 230 250	LightBlue	AD D8 E6	173 216 230	Gainsboro	DC DC DC	220 220 220
Thistle	D8 BF D8	216 191 216	SkyBlue	87 CE EB	135 206 235	LightGrey	D3 D3 D3	211 211 211
Plum	DD A0 DD	221 160 221	LightSkyBlue	87 CE FA	135 206 250	Silver	C0 C0 C0	192 192 192
Violet	EE 82 EE	238 130 238	DeepSkyBlue	00 BP FF	0 191 255	DarkGray	A9 A9 A9	169 169 169
Orchid	DA 70 D6	218 112 214	DodgerBlue	1E 90 FF	30 144 255	Gray	B0 B0 B0	128 128 128
Fuchsia	FF 00 FF	255 0 255	CornflowerBlue	64 95 ED	100 149 237	DimGray	69 69 69	105 105 105
Magenta	FF 00 FF	255 0 255	MediumSlateBlue	7B 68 EE	123 104 238	LightSlateGray	77 88 99	119 136 153
MediumOrchid	BA 55 D3	186 85 211	RoyalBlue	41 69 E1	65 105 225	SlateGray	70 80 90	112 128 144
BlueViolet	8A 2B E2	138 43 226	MediumBlue	80 90 CD	0 0 205	Black	00 00 00	0 0 0
DarkViolet	94 00 D3	148 0 211	DarkBlue	00 00 BB	0 0 139			
DarkOrchid	99 32 CC	153 50 204	Navy	00 00 80	0 0 128			
DarkMagenta	8B 00 BB	139 0 139	MidnightBlue	19 19 70	25 25 112			
Purple	80 00 80	128 0 128						
Indigo	4B 00 82	75 0 130						
SlateBlue	6A 5A CD	106 90 205						
DarkSlateBlue	48 3D 8B	72 61 139						
MediumSlateBlue	7B 68 EE	123 104 238						

# Color and plots

- Masked gamut doesn't work here

- Contrast
- Suggestion: one color from each group



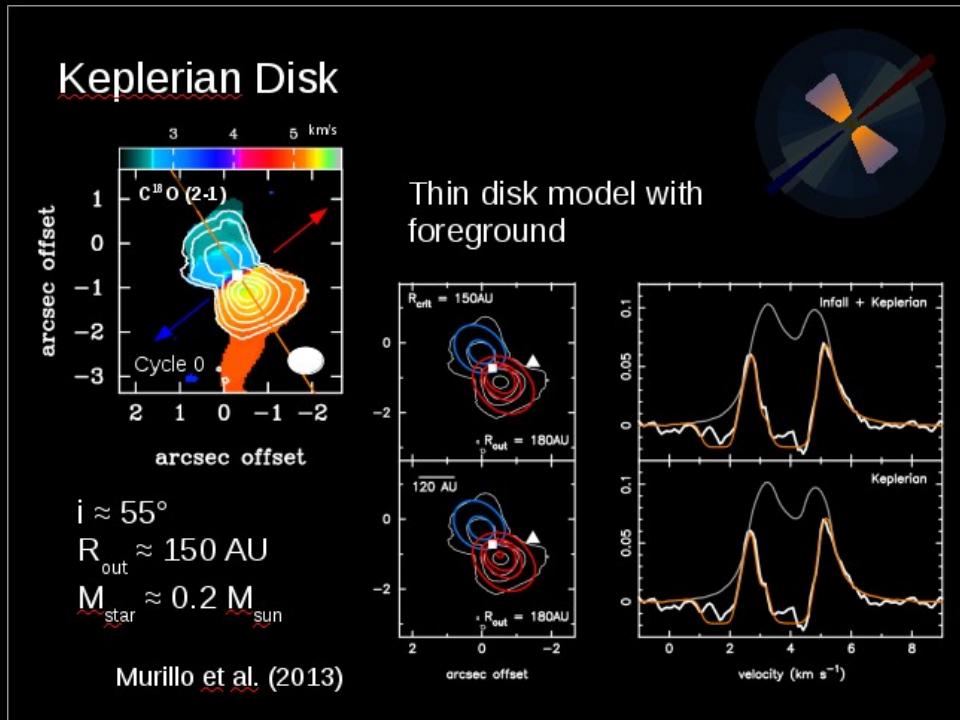
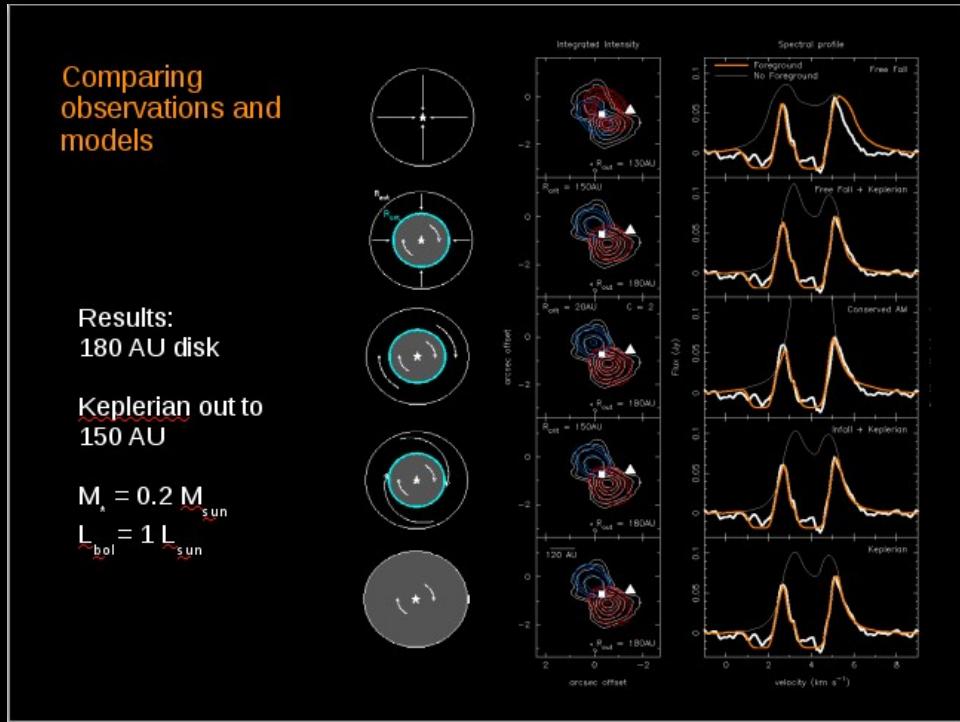


# Bad

(OK~ish for papers,  
with a good caption)

# Good

# Bad

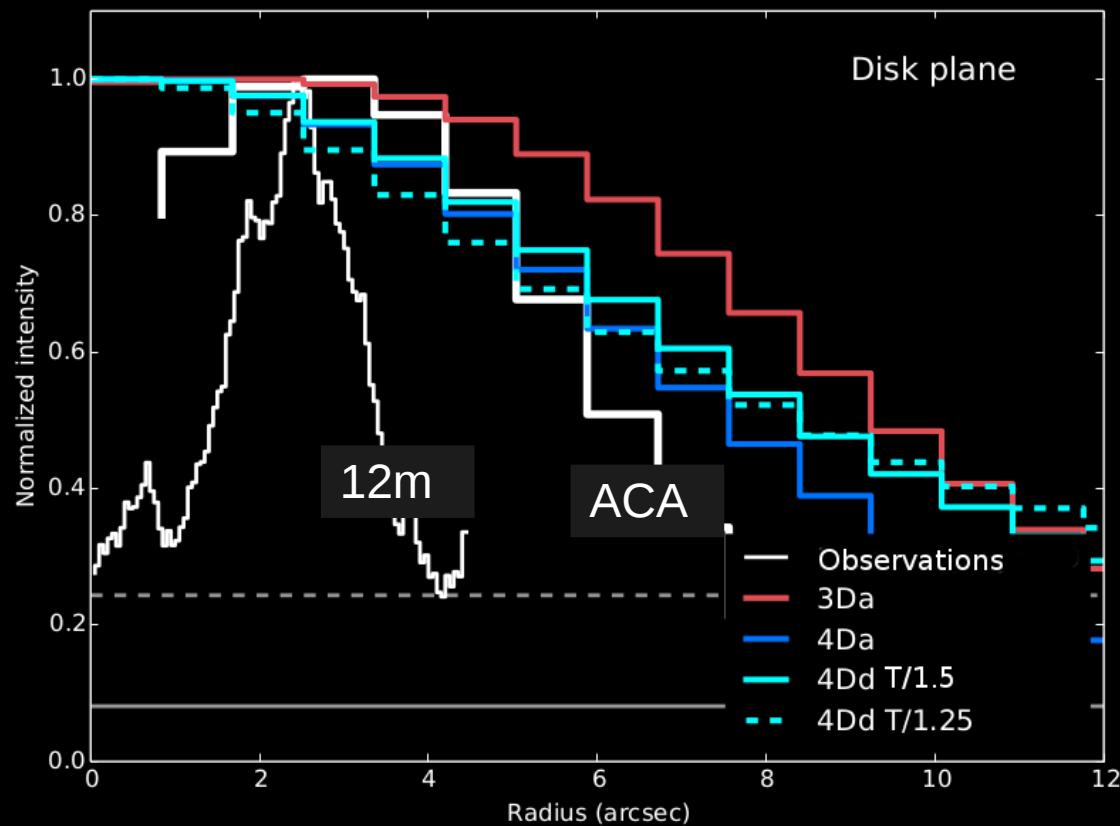
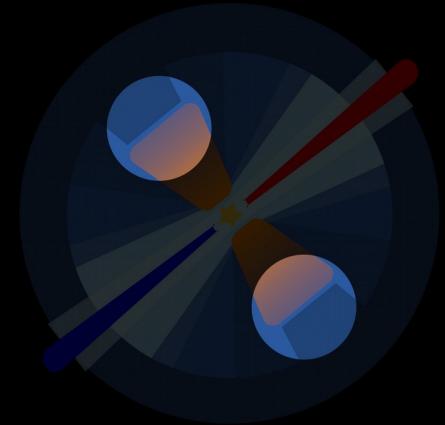


# Good

# Disk-Envelope interface

Simple DCO<sup>+</sup> chemical network

VLA1623 source profile derived from single dish observations (Jorgensen et al. 2002)



Observations modeled with a decrease to the Temperature profile by a factor of 1.5

And with drop abundance profile

Disk Shadowing → cold regions at disk-envelope interface



## Resolving the two outflows from the Class 0 protostellar VLA1623

Nadia M. Murillo and Shih-Ping Lai

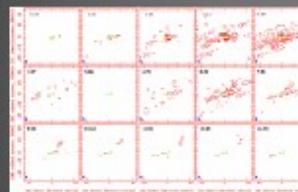
Department of Physics & Institute of Astronomy, National Tsing Hua University

ABSTRACT

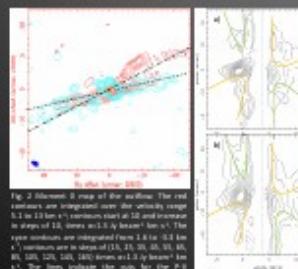
Protostellar outflows are an important part of the star forming process, influencing the protostar's surrounding environment. We study the class 0 protostellar source VLA1623, embedded in the  $\rho$  Ophiuchi cloud. Previous observations have shown that the circumstellar envelope of VLA1623 breaks up into two almost equal point sources in continuum emission at high resolution, with a separation of less than 200AU and very little free-free emission (Looney et al., 2000). This strongly suggests that VLA1623 is a very young binary system, a protobinary system. Our new observations of VLA1623 were done using the Submillimeter Array (SMA) in compact configuration. We traced the outflow in the  $^{12}\text{CO}$  (3-2) line. The overlapping blue and red morphology of VLA1623's outflow causes the outflow to seem complex. Studying the position and characteristics of the lobes in the CO channel map, and comparing it to the extended channel maps of previous studies, we arrive at the conclusion that the complex outflow of VLA1623 is in fact two outflows, one emanating from each source. Here we present a model of the two outflows. The SD and C $^{13}\text{O}$  line emissions closely match with the continuum emission of the circumstellar envelope, suggesting infalling material, in agreement with the fact that VLA1623 is a class 0 protostellar system.

### INTRODUCTION:

Protostellar outflows are one of the first indicators of star formation and can greatly influence the surrounding environment and the formation of a star. VLA1623 is a prototypical class 0 source (André et al., 1990) located in the  $\rho$  Ophiuchi cloud. Previous studies determined that VLA1623 is associated with an extended though somewhat puzzling outflow, showing overlapping red and blue lobes (André et al., 1990). VLA1623 is also associated with the HH object HH113A (e.g. Caratto & Garatti et al., 2006). Several studies have suggested the existence of two outflows as a result of comparing observations in CO and H $\alpha$  (e.g. Dent et al., 1995 and Caratto & Garatti et al., 2006); however, the outflows were not resolved. Continuum emission observations of VLA1623 at high resolution have determined that VLA1623 is very likely a young binary system (Looney et al., 2000), a protobinary system, containing VLA1623A and VLA1623B. From this same observation, A and B appear to be separated by a distance of roughly 200AU. The presence of a binary system supports the argument that the seemingly complex outflow of VLA1623 is in fact two outflows.



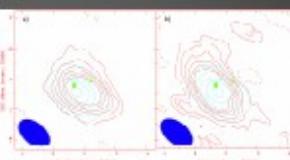
**OBSERVATIONS:**  
Observations of VLA1623 were carried out using the Submillimeter Array (SMA) in compact configuration, using 7 of the 8 antennas, on July 2007. Observations were centered on [16:26:28.349, -24:24:30.0]. The observation provided three lines and continuum:  $^{12}\text{CO}$ , SD and continuum emission in the upper side band and C $^{13}\text{O}$  in the lower side band. The synthesized beam size is 2.34'  $\times$  2.36'. Data reduction was entirely carried out using the MIRAD package. The systemic velocity is located at 3.7 km/s. The coordinates of the two sources were taken from Looney et al. 2000.



**REFERENCES:**

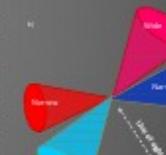
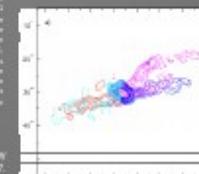
- André, Martín Pintado, DePoy & Montmerle 1990, A&A, 236, 180
- André, Ward-Thompson, Barsony 1993 ApJ, 406, 122
- Caratto & Garatti, Giannini, Nanni & Lorenzetti 2006, A&A, 449, 1077
- Dent, Matthews & Walther 1995, MNRAS, 277, 193
- Looney, Mundy & Welch 2000, ApJ, 519, 477

# Bad



### MODEL:

VLA1623 is very likely a protobinary system. It is then very possible that the source is emitting complex outflow in fact indeed two outflows, one narrow and one wide. Studying the  $^{12}\text{CO}$  channel map that traces the outflow, we separated the outflow into two bipolar outflows. The criterion used to separate the outflows was based on the characteristic of most outflows to generate a 'leaf' of material or accumulate material at the base of the outflow, i.e. near the source. Following this criterion, the characteristics of the lobes and comparing our maps with maps of previous studies, we 'resolved' the two outflows, each one emanating from one source, and derived a model of the two outflows, shown in figure 5.



**CONCLUSION AND FUTURE WORK:**  
Our observation of VLA1623's molecular outflow shows the overlapping morphology, agreeing with previous studies of the outflow. However, our observations were made closer to the source, showing only a fraction of the much more extended outflow. The resolution of our observation allowed us to resolve the different lobes and confirm the idea that VLA1623 does indeed present two outflows. The red shifted lobes are easier to distinguish, since they seem to be interacting with each other. The blue shifted lobes are more difficult to separate clearly, as they are probably interacting.  
The SD emission in our observation is probably tracing the shock product of the interaction of the two blue shifted lobes. This is suggested by the velocity range 0.17 to 4.4 km/s and position of the SD emission, which closely match the velocity range and position where the lobes show more interaction.  
We expect the C $^{13}\text{O}$  emission (1.5 km/s to 4.9 km/s) is tracing the circumstellar material.  
Although we have determined the red and blue shifted components of the two outflows in this study, we still cannot clearly determine the source of each outflow. Here we have only made an approximation based on the criterion used to separate the lobes. We require further observations of VLA1623 to determine the source of each outflow and if the blue shifted components are interacting.

**REFERENCES:**

## Tracing the disk, envelope & outflow cavity of VLA1623 with ALMA



Nadia Murillo<sup>1</sup>, Catherine Walsh<sup>2</sup>, Ewine van Dishoeck<sup>1,2</sup>, Simon Bruderer<sup>3</sup>, Daniel Harsono<sup>3</sup> & Shih-Ping Lai<sup>4</sup>

<sup>1</sup>: Max Planck Institute for Extraterrestrial Physics; <sup>2</sup>: Leiden Observatory, Leiden University; <sup>3</sup>: Center for Astronomy, University of Heidelberg; <sup>4</sup>: Institute of Astronomy, National Tsing Hua University

What is the physical and chemical structure of the envelope and outflow cavity of a deeply embedded protostar? How does this change when a Keplerian disk is involved?

### 2. The Keplerian disk

ALMA Cycle 0  $^{12}\text{CO}$  2-1

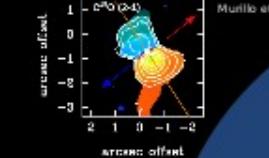
Thin disk model  
with foreground

VLA1623A:  
Keplerian disk  
 $R_{\text{disk}} = 150$  AU  
 $i = 55^\circ$   
 $M_{\text{disk}} = 0.2 M_{\odot}$

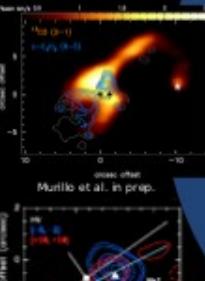
$\Delta^2 \sim 800$  AU

VLA1623: Early Class 0 to Class I  
 $\rho$  Oph:  $d \sim 210$  pc  
 $V_{\text{LSR}} = 3.7$  km/s

Murillo & Lai (2013)



### 4. The outflow cavity



VLA1623A's outflow cavity  
lights up  $^{12}\text{CO}$  like a PDR,  
with  $\text{C}_2\text{H}_2$  along cavity wall  
(not disk-envelope interface)

VLA1623W outflow not  
as strong

1.

2.

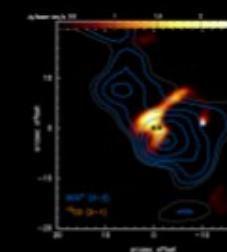
3.

4.

5.

VLA1623B shows a fast jet in  $^{12}\text{CO}$

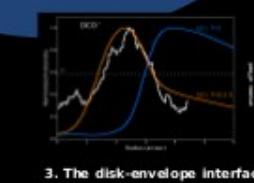
Santangelo et al. (2015)



### 5. The envelope

ALMA Cycle 2 main array  
and ALMA reveal VLA1623's  
envelope to have  
a layered structure

Murillo et al. in prep.



### 3. The disk-envelope interface

Modeling of  $\text{DCO}^+$  chemistry shows that temperature needs to be decreased from 24K to 16K behind disk edge to match observations.

Disk midplane shadows the envelope,  
shifting cold-enhanced molecules closer to the central star

# Good



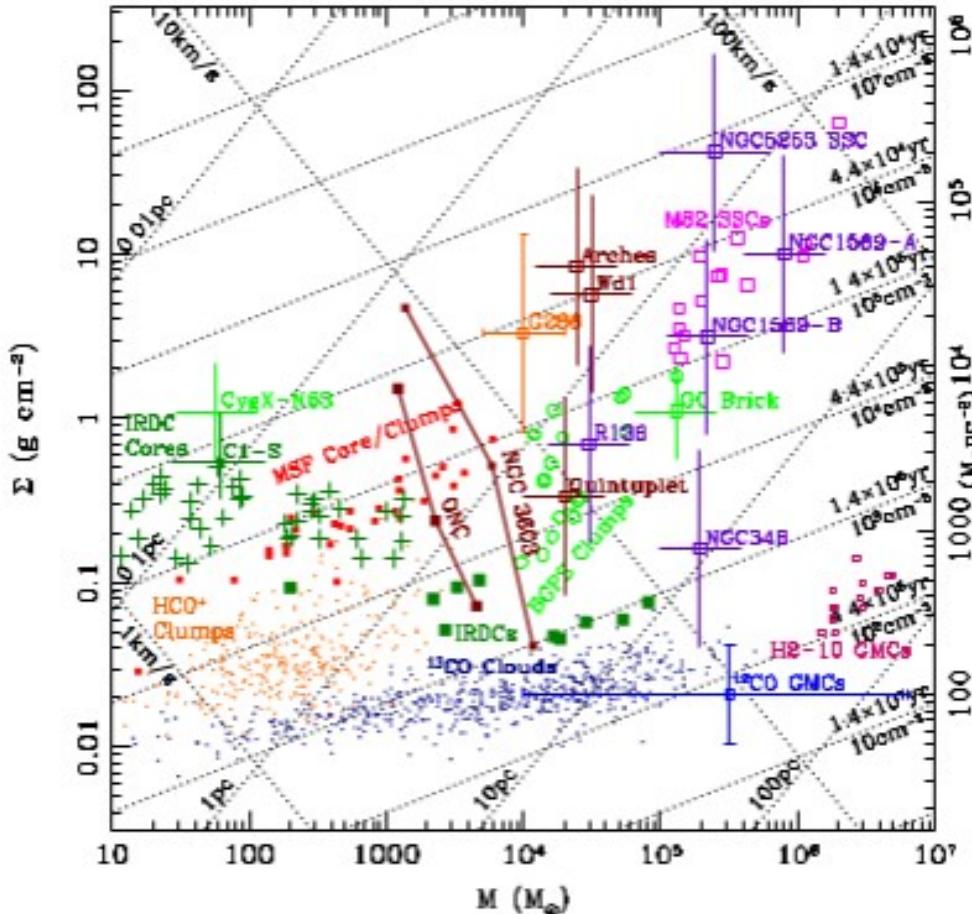


Fig. 1.— The Environments of Massive Star Formation. Mass surface density,  $\Sigma = M/(rR^2)$ , is plotted versus mass,  $M$ . Dotted lines of constant radius,  $R$ , H number density,  $n_{\text{H}}$  (or free-fall time,  $t_{\text{ff}} = (3\pi/[32G\rho])^{1/2}$ ), and escape speed,  $v_{\text{esc}} = (10/\sigma n_{\text{H}})^{1/2}\sigma$ , are shown. Stars form from molecular gas, which in the Galaxy is mostly organized into GMCs. Typical  $^{12}\text{CO}$ -defined GMCs have  $\Sigma \sim 100 M_\odot \text{ pc}^{-2}$  (Solomon *et al.*, 1987) (see Tave *et al.*, 2013a for detailed discussion of the methods for estimating  $\Sigma$  for the objects plotted here), although denser examples have been found in Henize 2-10 (Santangelo *et al.*, 2009). The  $^{13}\text{CO}$ -defined clouds of Roman-David *et al.* (2010) are indicated, along with  $\text{HCO}^+$  clumps of Barnes *et al.*, (2011), including G286.21+0.17 (Barnes *et al.*, 2010). Along with G286, the BGPS clumps (Ginsburg *et al.*, 2012) and the Galactic Center "Brick" (Longmore *et al.*, 2012) are some of the most massive high- $\Sigma$  gas clumps known in the Milky Way. Ten example Infrared Dark Clouds (IRDCs) (Kainulainen and Tan 2013) and their internal core/clumps (Butler and Tan, 2012) are shown, including the massive, monolithic, highly-deuterated core C1-S (Tan *et al.*, 2013b). CygX-N63, a core with similar mass and size as C1-S, appears to be forming a single massive protostar (Bontemps *et al.*, 2010; Dearte-Cabral *et al.*, 2013). The IRDC core/clumps overlap with Massive Star-Forming (MSF) core/clumps (Mueller *et al.*, 2002). Clumps may give rise to young star clusters, like the ONC (e.g., Da Rio *et al.*, 2012) and NGC 3609 (Pang *et al.*, 2013) (radial structure is shown from core to half-mass,  $R_{1/2}$  to outer radius), or even more massive examples, e.g., Westerlund 1 (Lin *et al.*, 2013), Arches (Habibi *et al.*, 2013), Quintuplet (Hofmann *et al.*, 2012) (shown at  $R_{1/2}$ ), that are in the regime of "super star clusters" (SSCs), i.e., with  $M_* \gtrsim 10^5 M_\odot$ . Example SSCs in the Large Magellanic Cloud (LMC) (RI 36, Andersen *et al.*, 2009) and Small Magellanic Cloud (SMC) (NGC 346, Subba *et al.*, 2008) display a wide range of  $\Sigma$ , but no evidence of IMF variation (red box). Even more massive clusters can be found in some dwarf irregular galaxies, such as NGC 1569 (Larsen *et al.*, 2008) and NGC 5253 (Turner and Beck, 2004), and starburst galaxy M82 (McCrady and Graham, 2007).