

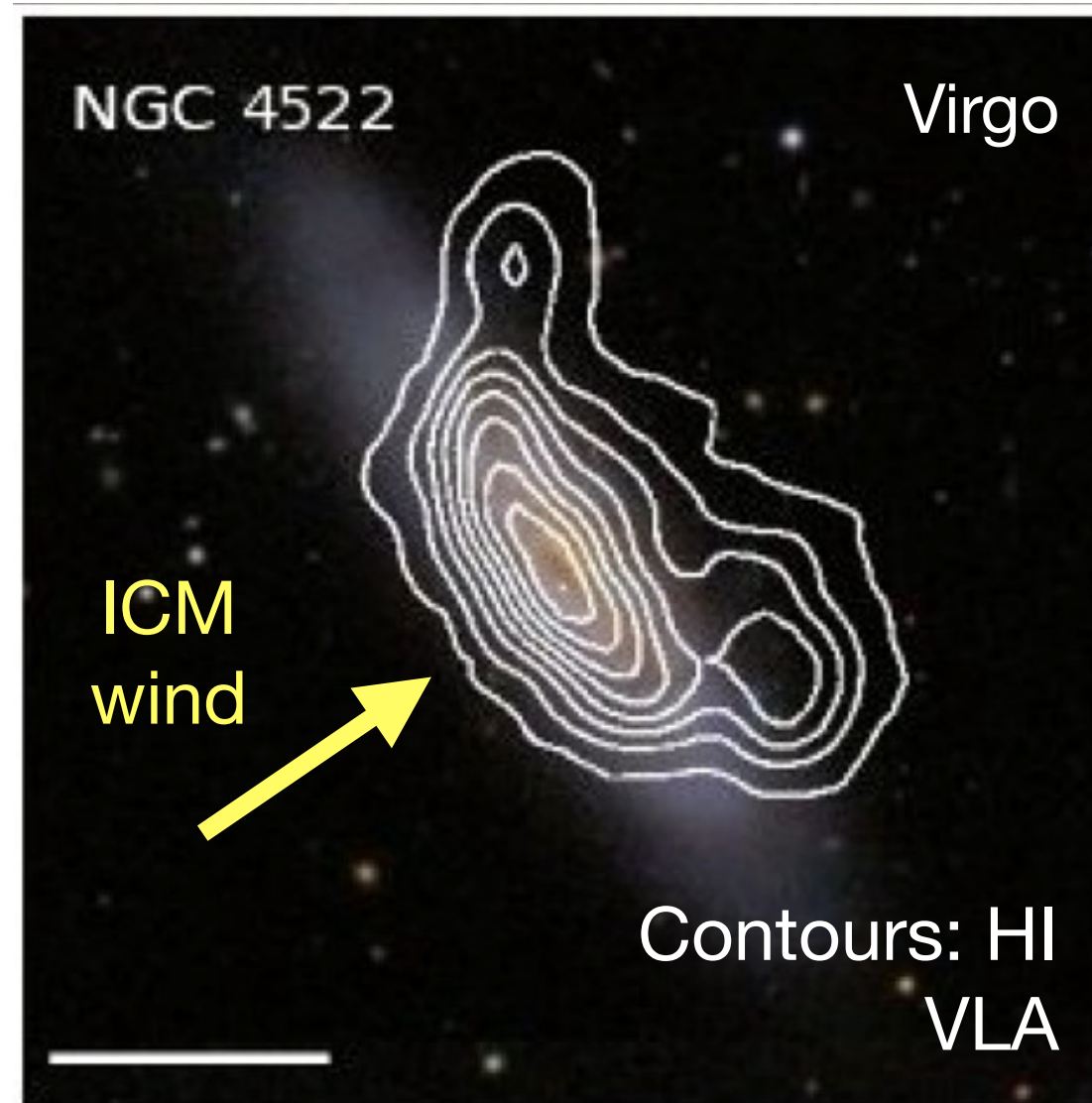
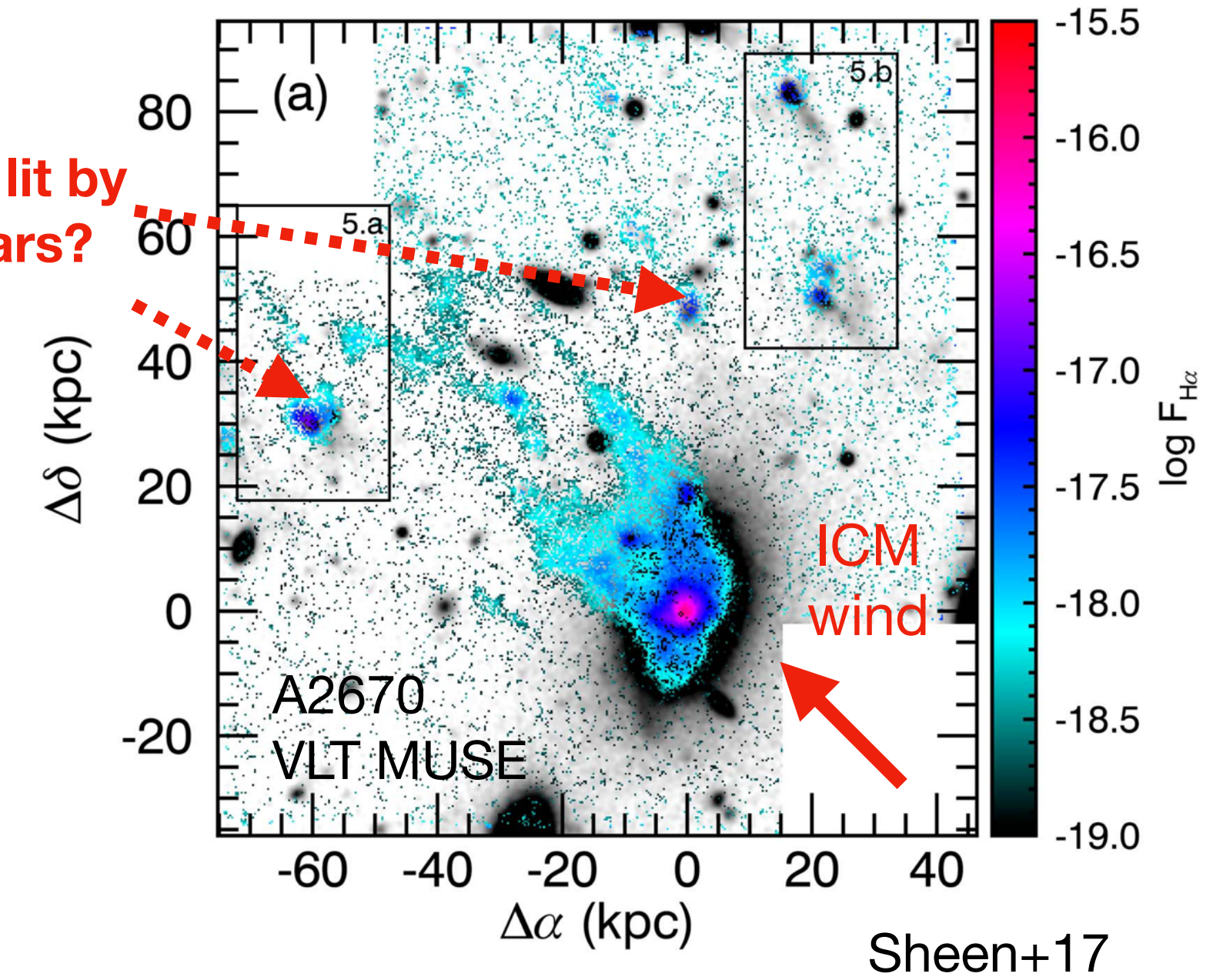
- Ram pressure stripping

- Hydrodynamical process directly blowing the ISM away from galaxies

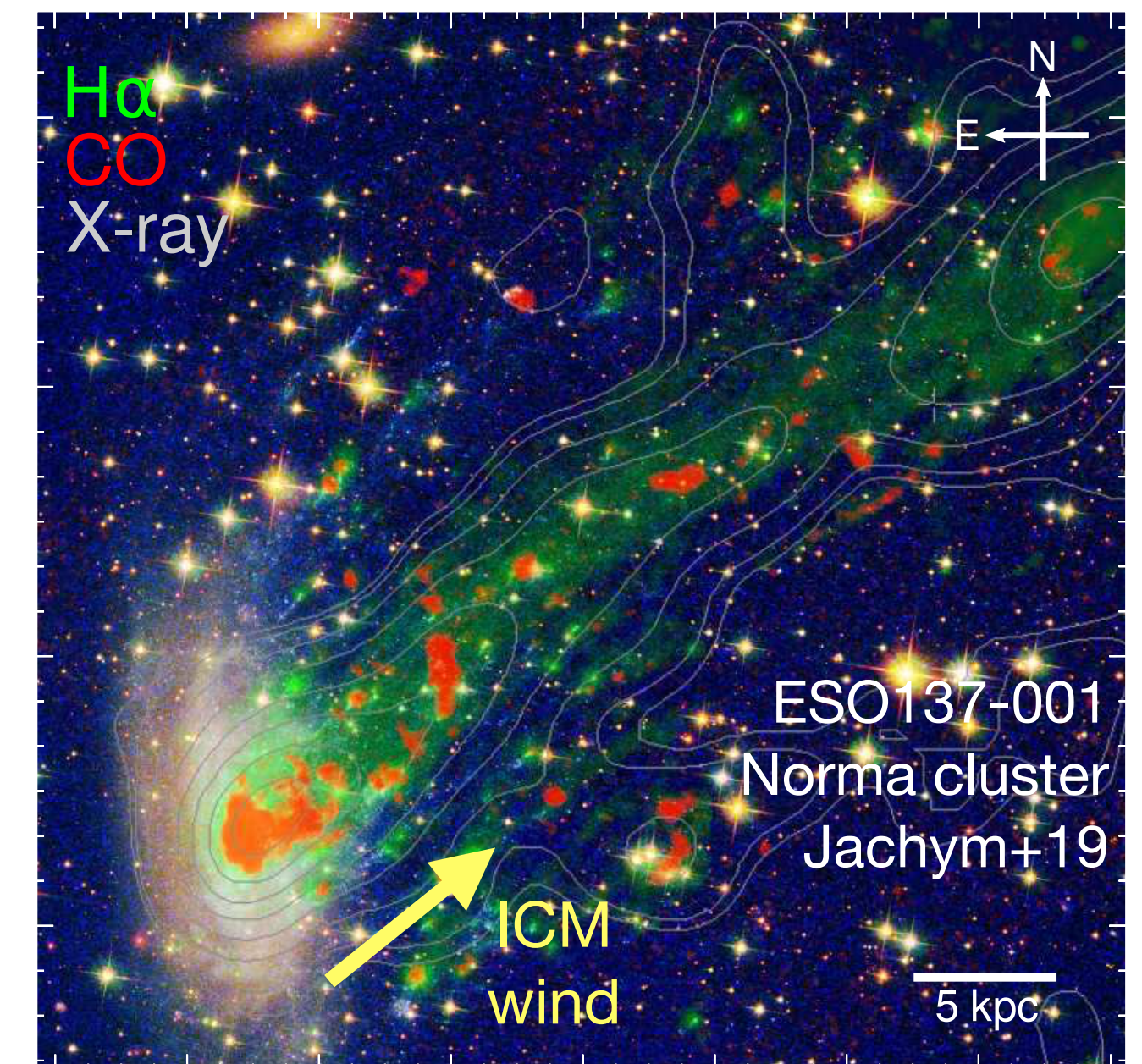
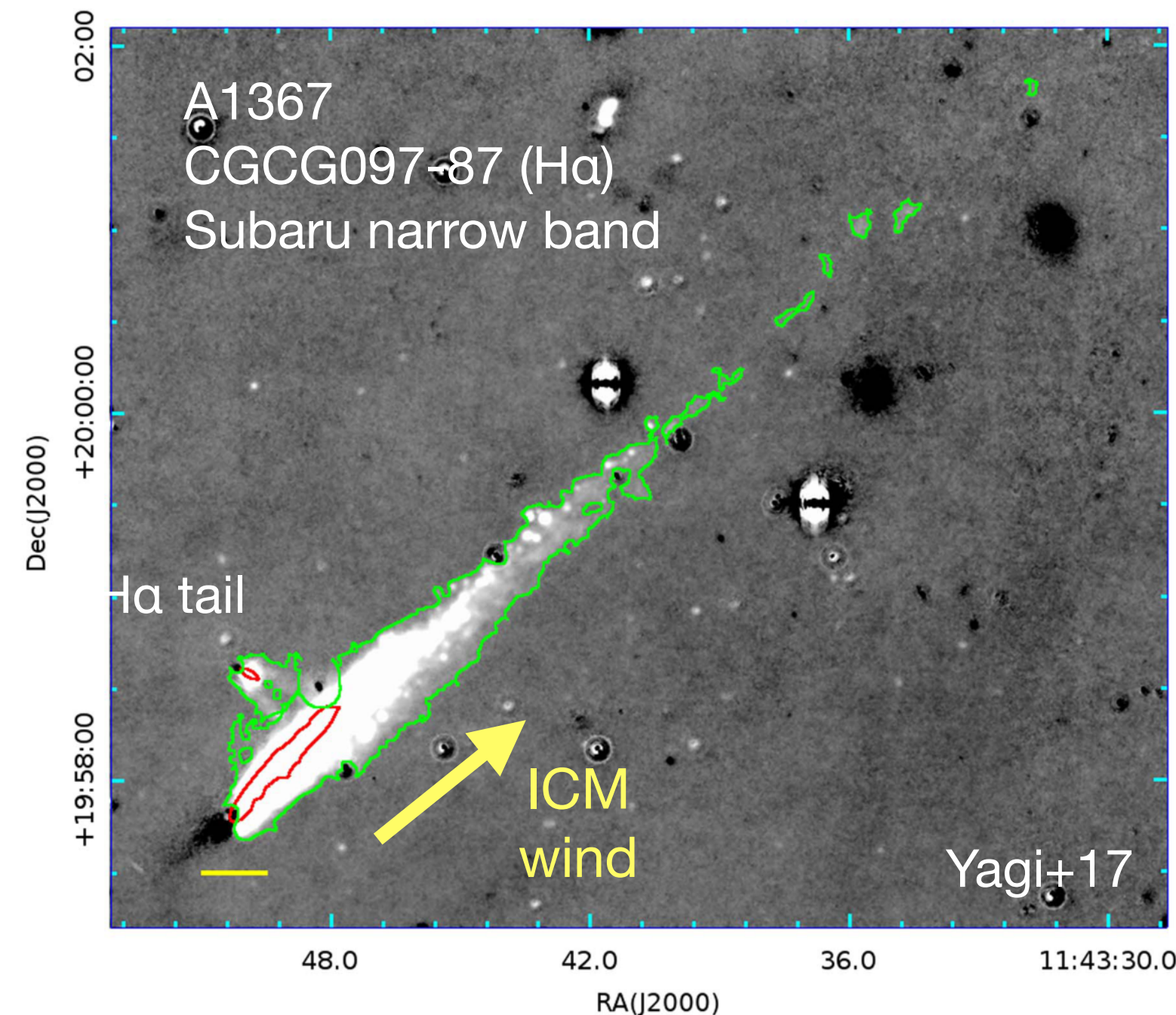
$$P_{\text{ram}} \sim \rho_{\text{ICM}} v^2 \quad (\text{Gunn\&Gott 72})$$

- Featured by multiphase tails (CO, HI, H α , and even X-ray)
- Young stars are detected in the wakes of some ram pressure stripped (RPS) galaxies

H α blobs lit by Young stars?



Chung+09



- Jellyfish galaxies - galaxies with characteristic tail features
 - How do the prominent features form?
- Main topics on my studies
 - Impact of ram pressure stripping on galaxies with a multiphase ISM (Lee+20)
 - Formation process of prominent jellyfish features (Lee+22)
 - Impact of magnetic fields on jellyfish galaxies (Lee+in prep)
- Methodology
 - Radiation (magneto-)hydrodynamical simulations for star-forming disk galaxies experiencing ram pressure in idealized environments

- RAMSES-RT

- Developed by Teyssier 02; Rosdahl+13; Rosdahl & Teyssier 15

- Based on an adaptive-mesh refinement code, RAMSES

- Tracing 8 photon groups, from extreme ultraviolet (UV) to infra-red (IR)

- Computing non-equilibrium chemistry and cooling of HI, HII, HeI, HeII, HeIII and e-

Photon group	ϵ_0 (eV)	ϵ_1 (eV)	κ (cm ² g ⁻¹)	Main function	
IR	0.1	1.0	5	Radiation pressure (RP)	~124000-12400Å
Optical	1.0	5.6	10 ³	Direct RP	-2214Å
FUV	5.6	11.2	10 ³	Photoelectric heating	-1107Å
LW	11.2	13.6	10 ³	H ₂ dissociation	- 912Å
EUV _{HI,1}	13.6	15.2	10 ³	H I ionization	- 816Å
EUV _{HI,2}	15.2	24.59	10 ³	H I and H ₂ ionization	- 504Å
EUV _{HeI}	24.59	54.42	10 ³	He I ionization	-228Å
EUV _{HeII}	54.42	∞	10 ³	He II ionization	>0Å

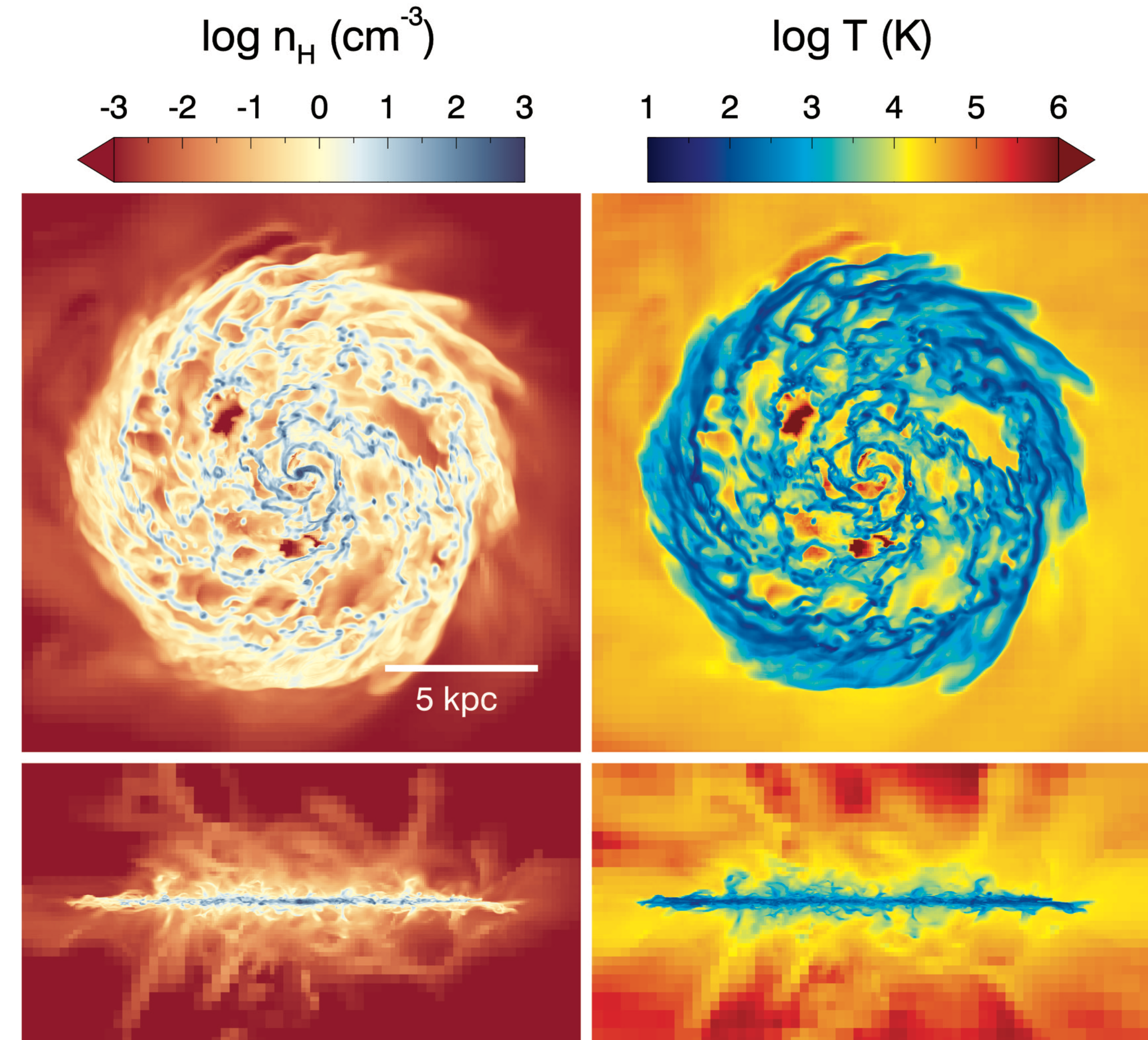
- RAMSES-RT
- Updated by Katz+17; Kimm+17, 18
 - H₂ formation and dissociation is included based on a modified photochemistry model
 - Formation of H₂ via dust and H⁻ channels
 - Destruction of H₂ via photo-dissociation and collisional ionization
 - Star formation efficiency (SFE) computed based on a thermo-turbulent model
 - SFE can vary, depending on the turbulent condition of the ISM
 - Mechanical and radiative SN feedback

A field of galaxies, likely a galaxy cluster or a field of galaxies, with a prominent red glow on the right side, possibly indicating a specific region of interest or a specific type of galaxy. The galaxies are scattered across the frame, with some appearing as bright, distinct points and others as faint, diffuse structures. The red glow is concentrated on the right side, creating a gradient of color from dark red to bright red. The overall background is dark, making the galaxies and the red glow stand out.

Impact of Ram Pressure on Galaxies

- Simulation setup - galaxies

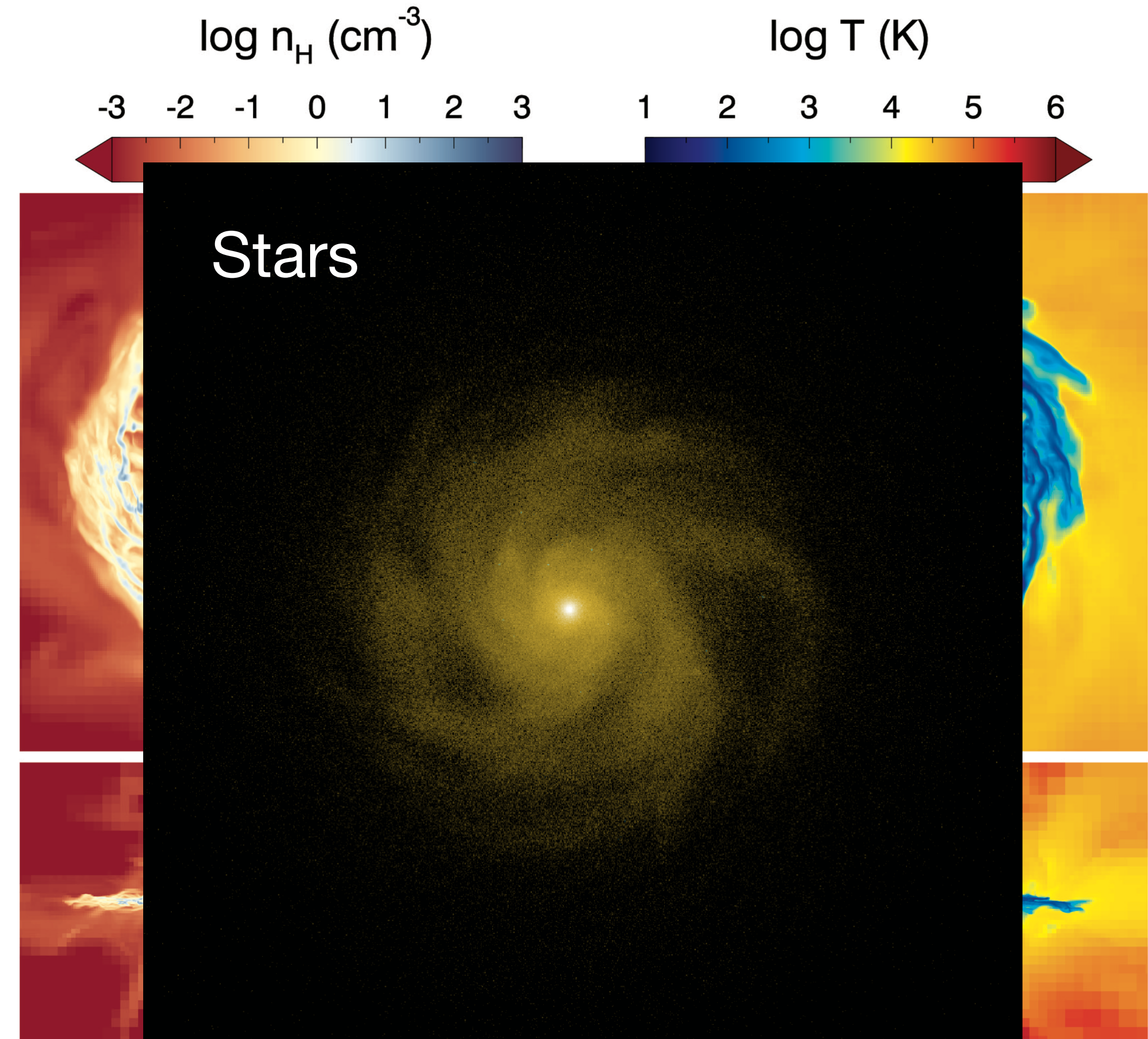
- Idealized wind-tunnel experiments
- IC (G9) generated by Rosdahl+15 using MakeDisk (Springel+05)
- Box size: 300kpc on a side
- $M_{\text{halo}} \sim 10^{11} M_{\odot}$, $R_{\text{vir}} = 89$ kpc
- $M_{\star} \sim 2.1 \times 10^9 M_{\odot}$ ($R_{1/2} \sim 2.4$ kpc), $Z_{\star} = 0.75 Z_{\odot}$
- Gas content
 - Normal gas fraction : $M_{\text{HI}}/M_{\star} \sim 0.54$ ($1.1 \times 10^9 M_{\odot}$)
- Cell resolution down to 18pc



Lee+20

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Lee+20

- Simulation setup - 4 runs
 - Isolated environment - no wind (control sample)
 - NoWind
 - Mild winds to mimic ram pressure at the cluster outskirts ($v_{\text{wind}}=1,000\text{km s}^{-1}$, $T_{\text{ICM}} \sim 3 \times 10^7\text{K}$, $n_{\text{H}}=3 \times 10^{-4}\text{cm}^{-3}$, $Z_{\text{ICM}}=0.3Z_{\odot}$)
 - Face-on wind (FaceWind)
 - Edge-on wind (EdgeWind)
 - Strong face-on winds to mimic ram pressure at the cluster center ($v_{\text{wind}}=1,000\text{km s}^{-1}$, $T_{\text{ICM}} \sim 3 \times 10^7\text{K}$, $n_{\text{H}}=3 \times 10^{-3}\text{cm}^{-3}$, $Z_{\text{ICM}}=0.3Z_{\odot}$)
 - Strong face-on wind (FaceWind10)

