Lyman-α emission properties of simulated galaxies: interstellar medium structure and inclination effects

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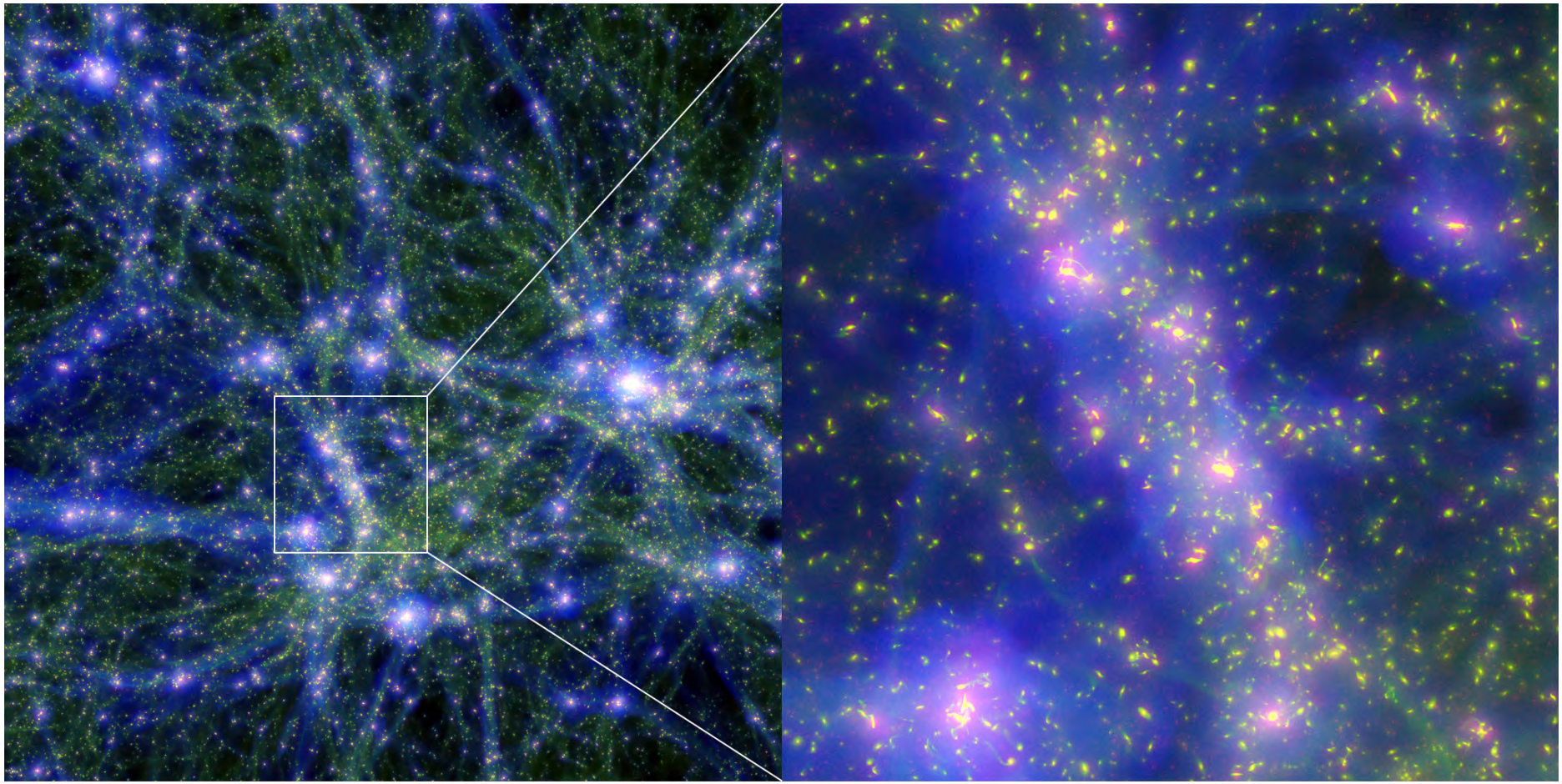
Abstract

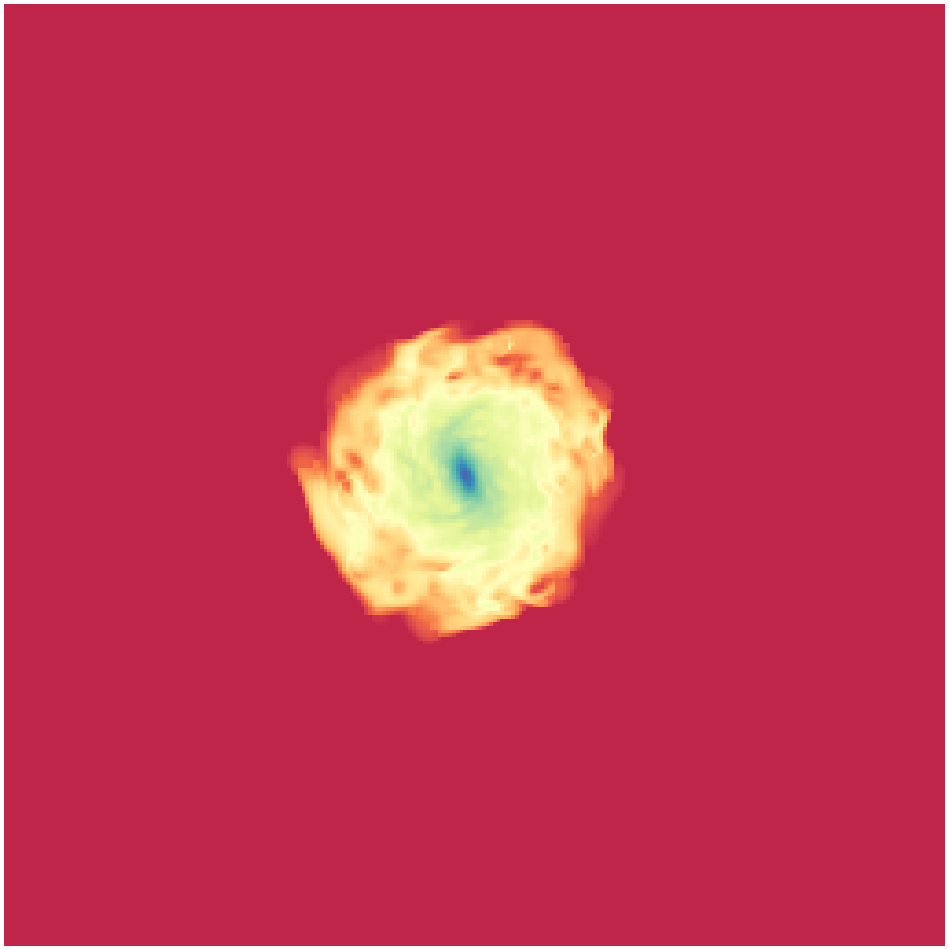
Aims. This paper is the first of a series investigating Lyman-alpha (hereafter Lyα) radiation transfer through hydrodynamical simulations of galaxy formation. Its aim is to assess the impact of the interstellar medium (ISM) physics on Lyα radiation transfer and to quantify how galaxy orientation with respect to the line of sight alters observational signatures.
Methods. We compare the results of Lyα radiation transfer calculations through the ISM of a couple of idealized galaxy simulations in a dark matter halo of $\sim 10^{10} M_{\odot}$. In the first one, G1, this ISM is modeled using physics typical of large scale cosmological hydro-

Context

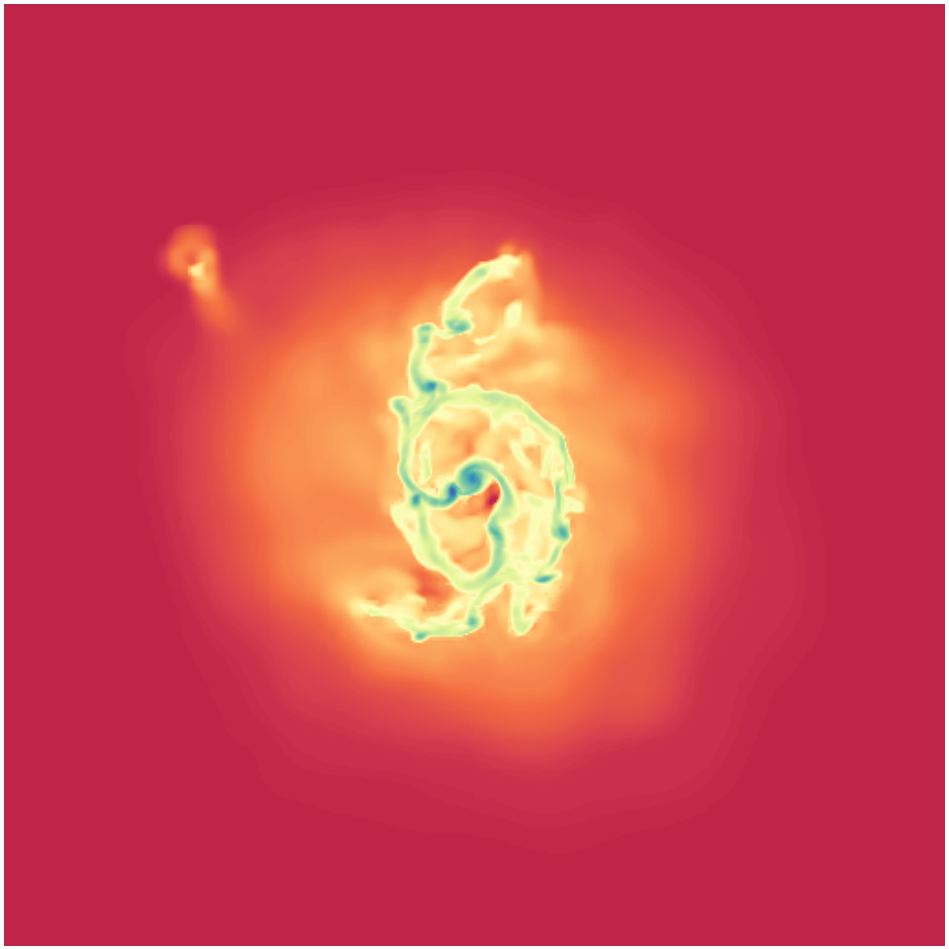


Does ISM structure impacts Lyα properties ?

the HOT galaxy G1

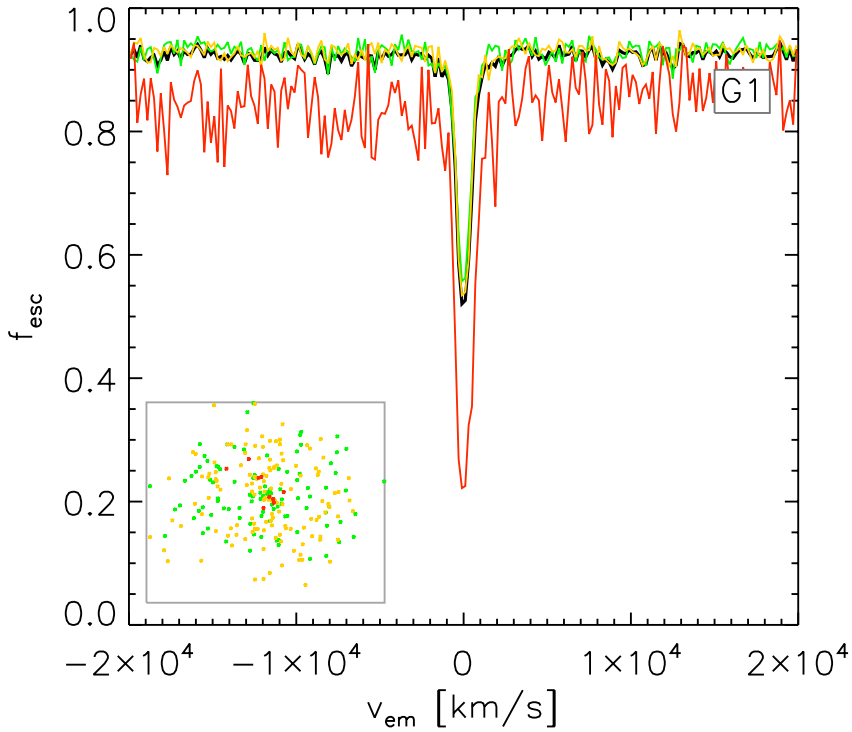


the COLD galaxy G2

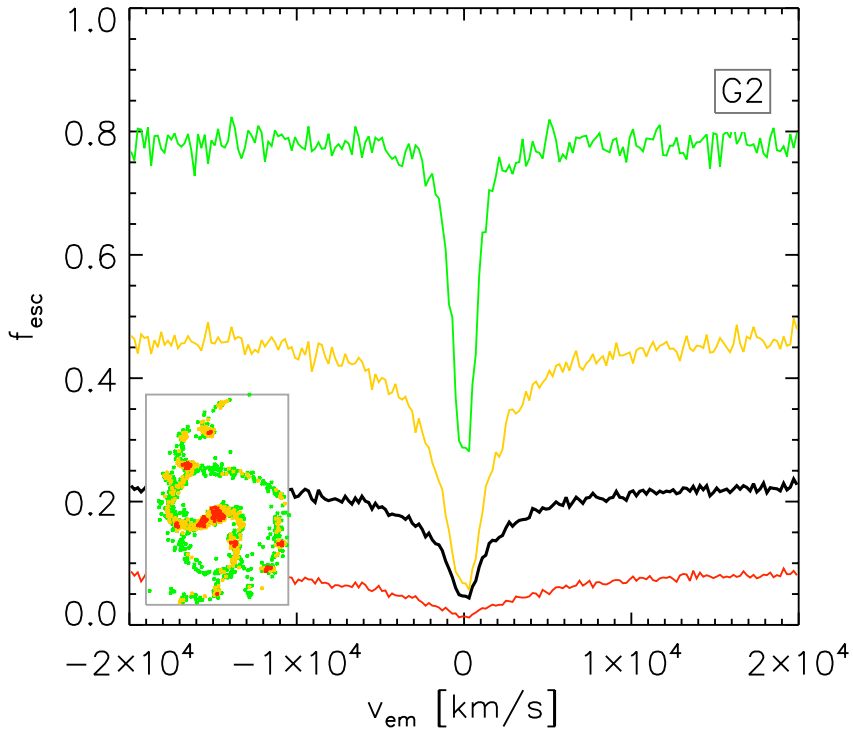


How ISM structure impacts Lyα escape fractions

f_{esc} vs density in G1

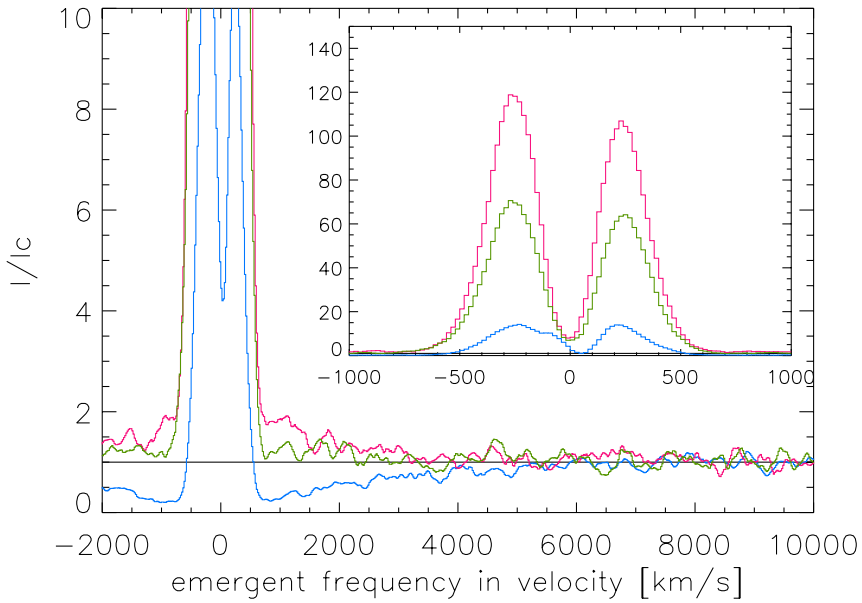


f_{esc} vs density in G2

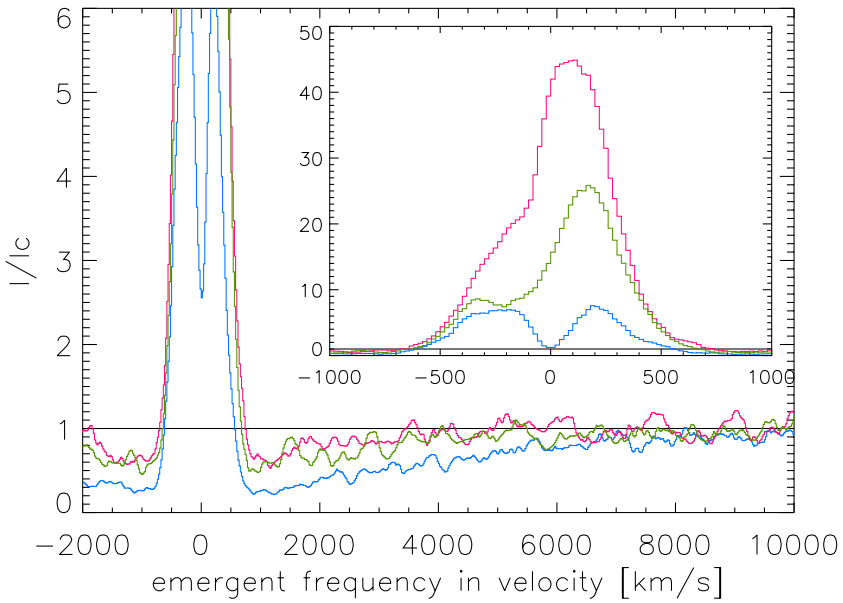


How ISM structure impacts Lyα spectra

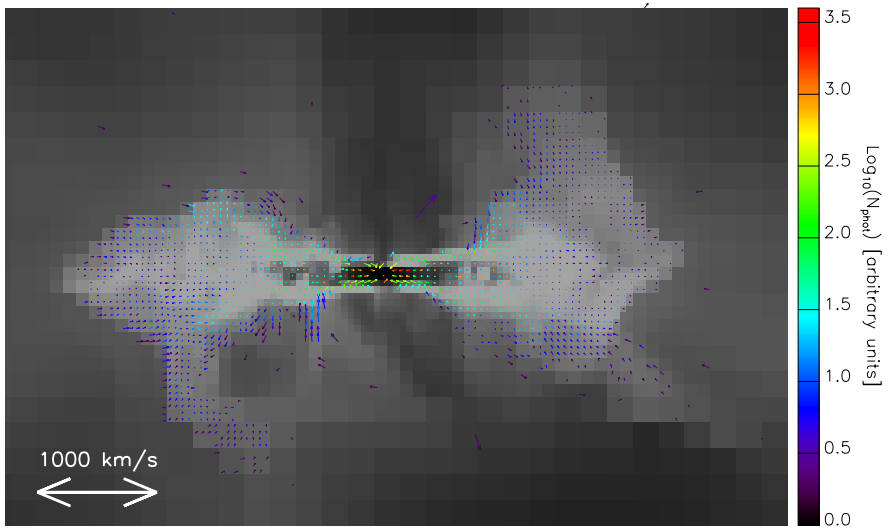
integrated spectra from G1

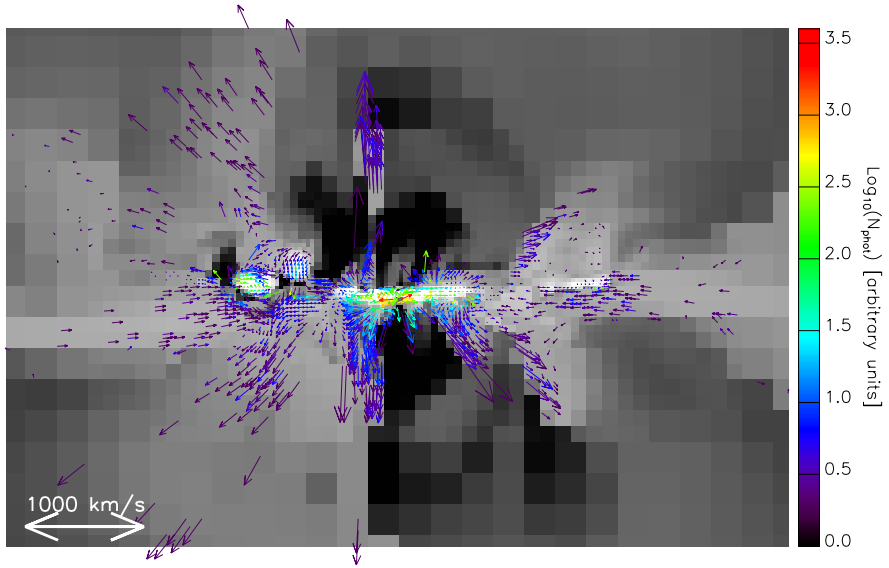


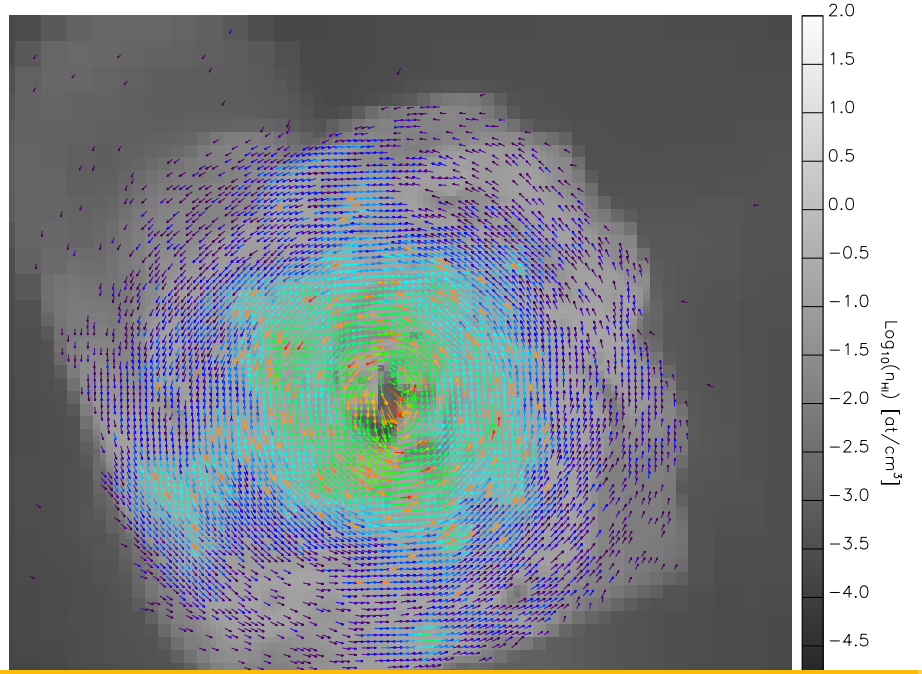
integrated spectra from G2

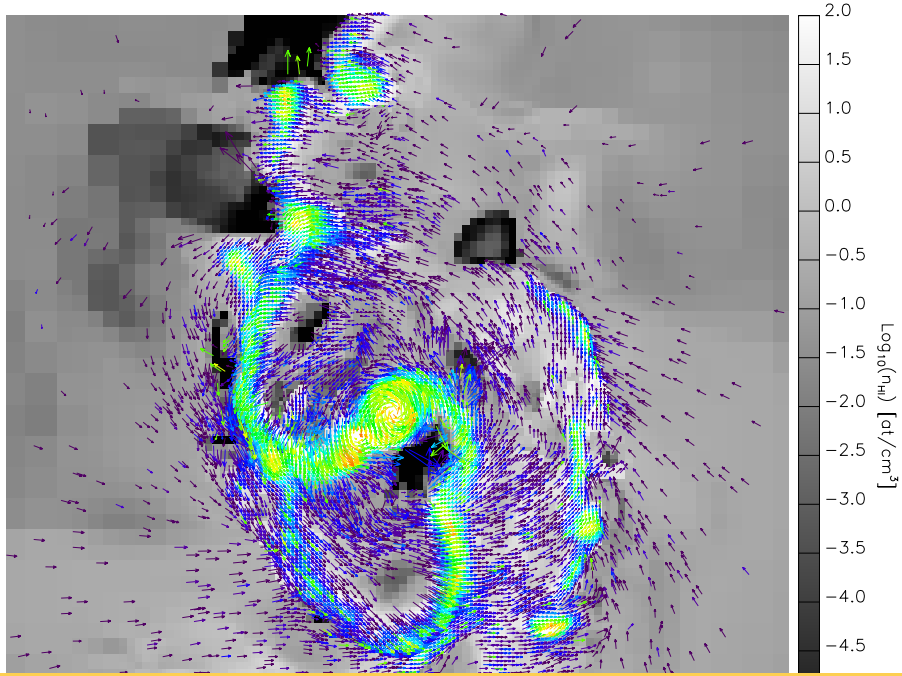


How ISM structure impacts Lyα spectra



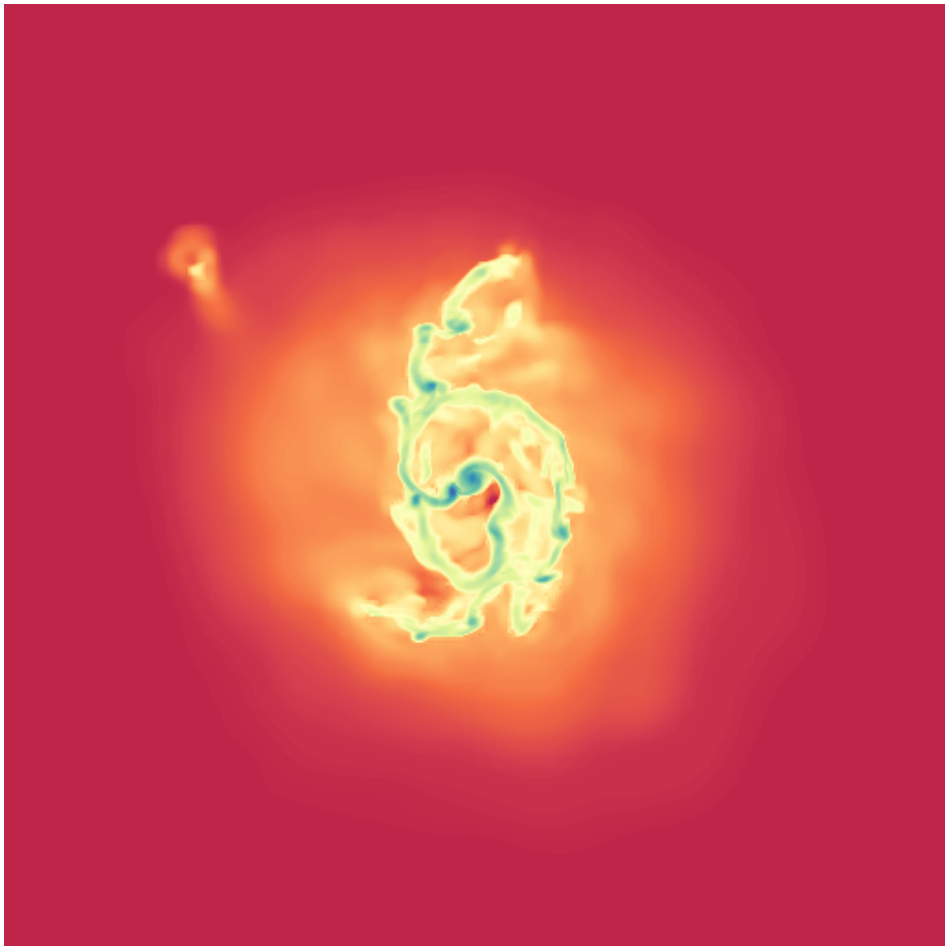




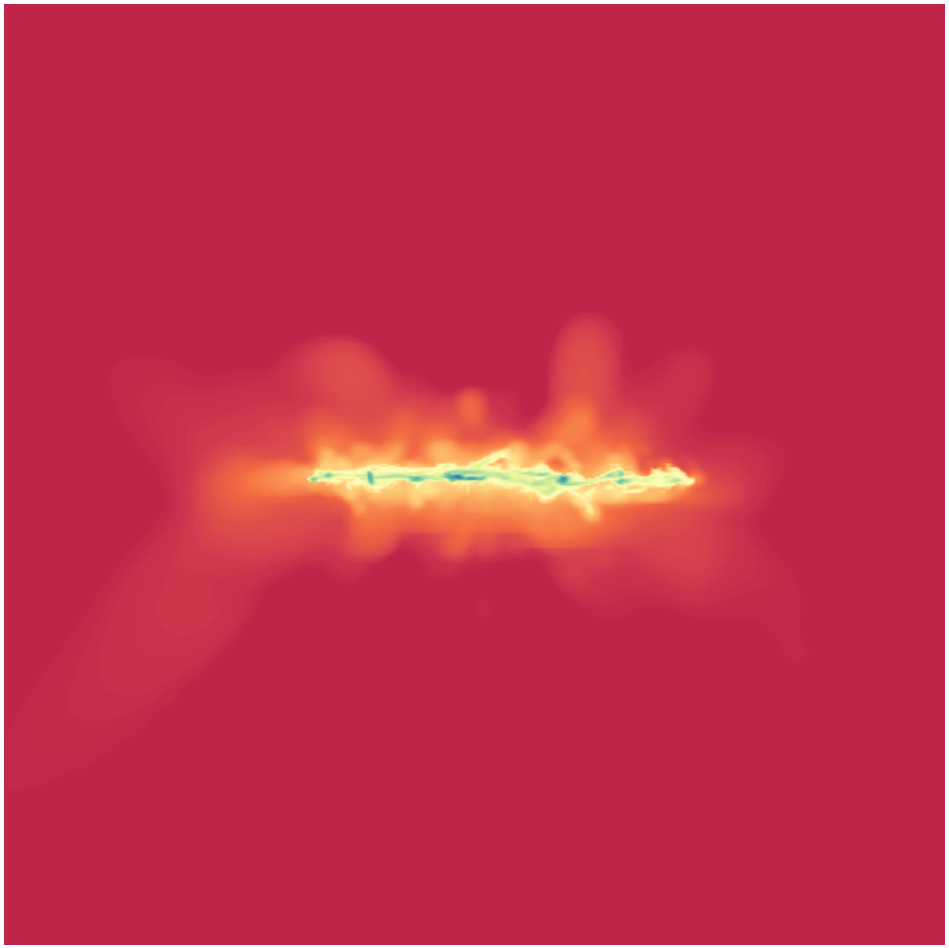


Does orientation impacts Lyα properties ?

G2 face-on

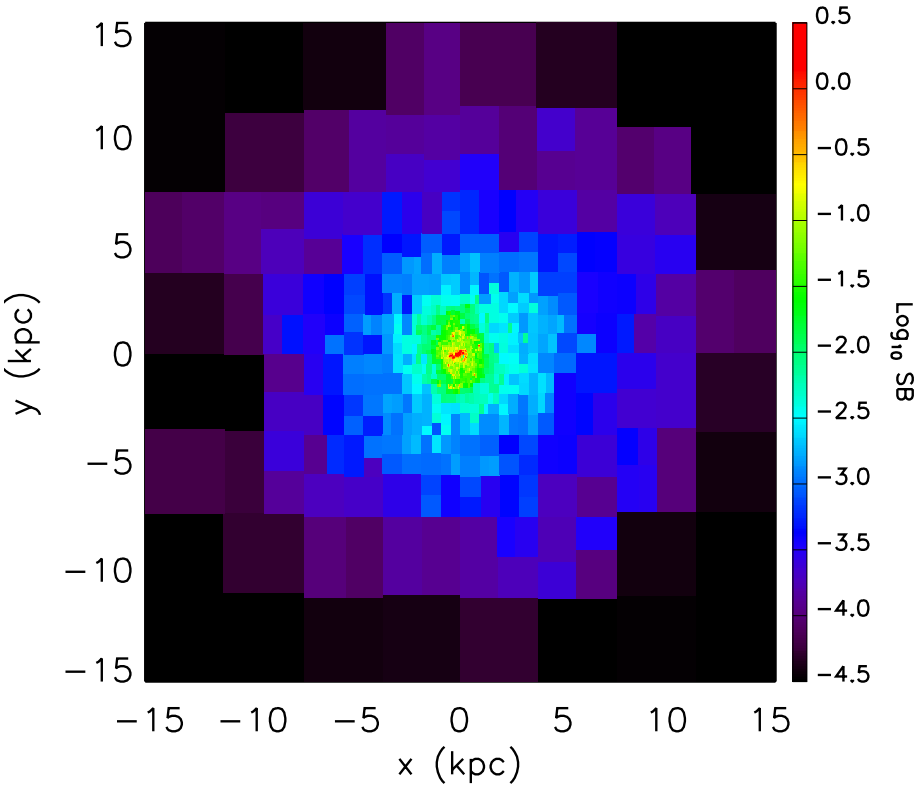


G2 edge-on



How orientation impacts Lyα properties

G2 face-on



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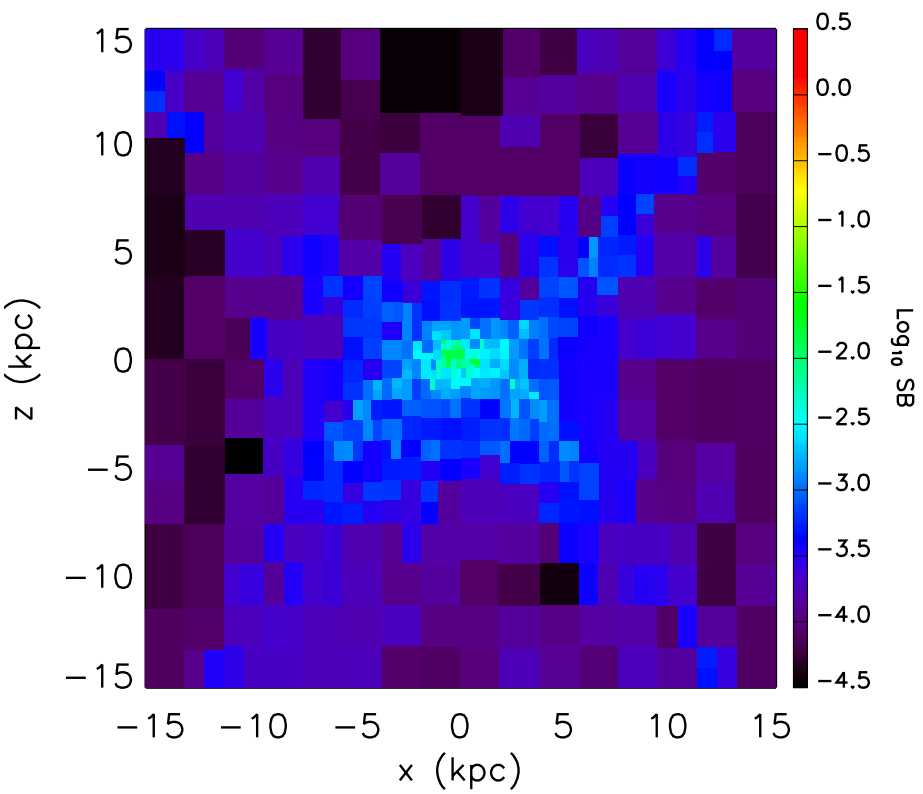
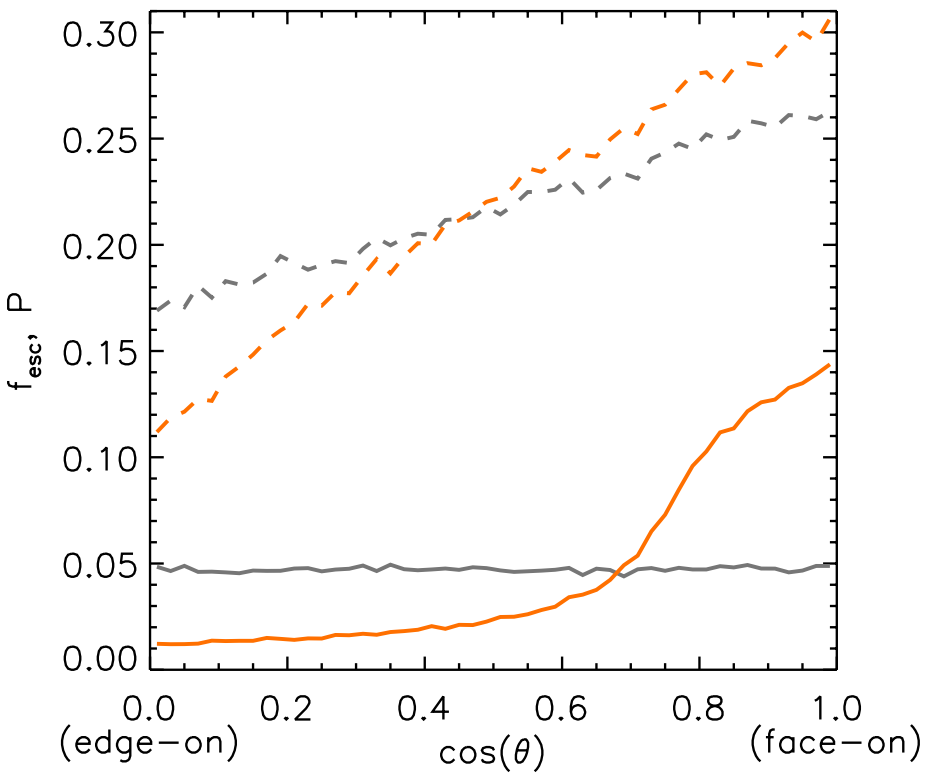
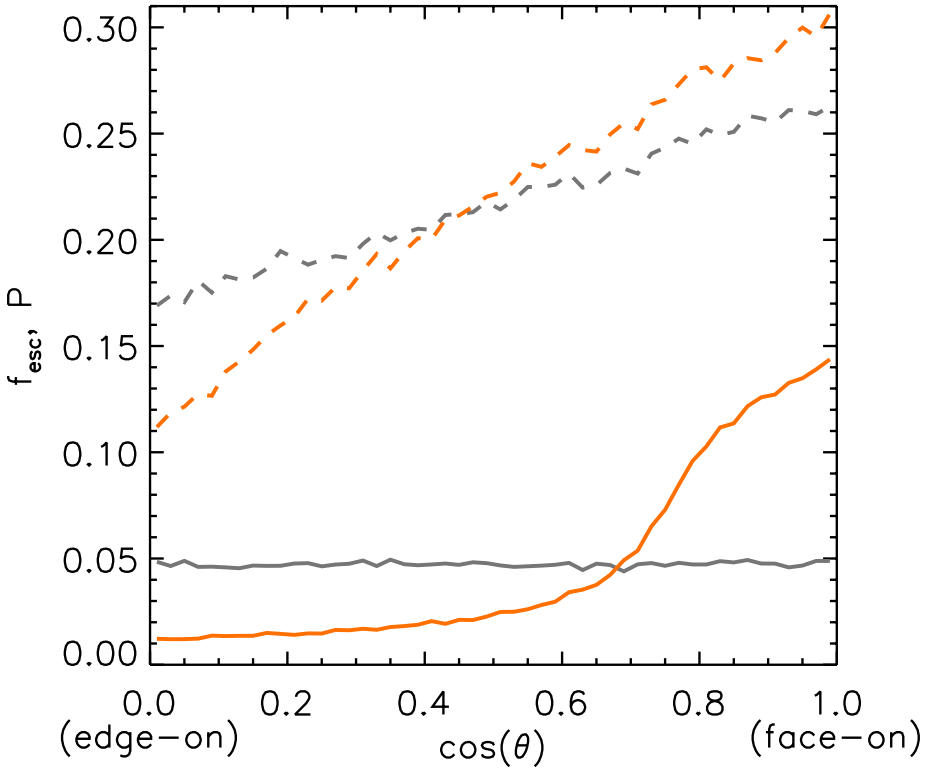
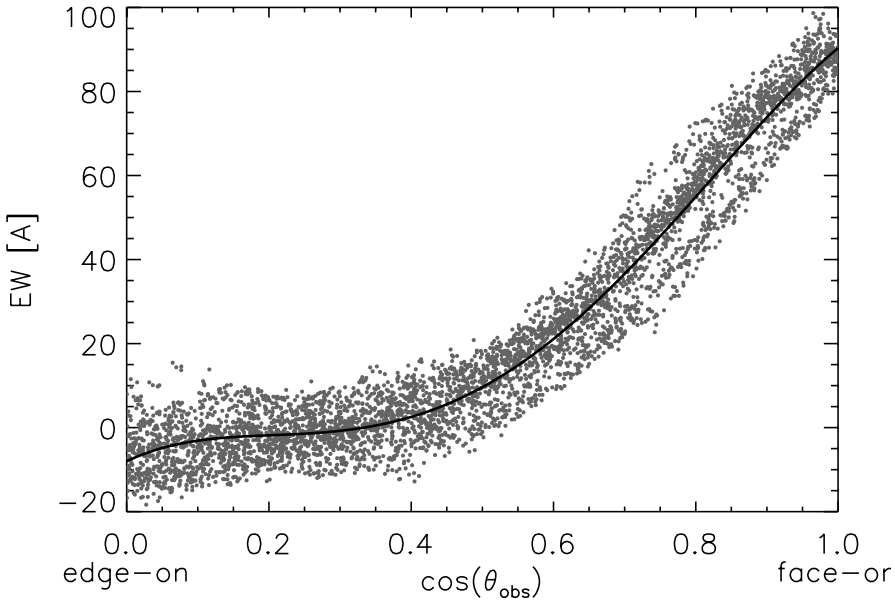


How orientation impacts Lyα properties

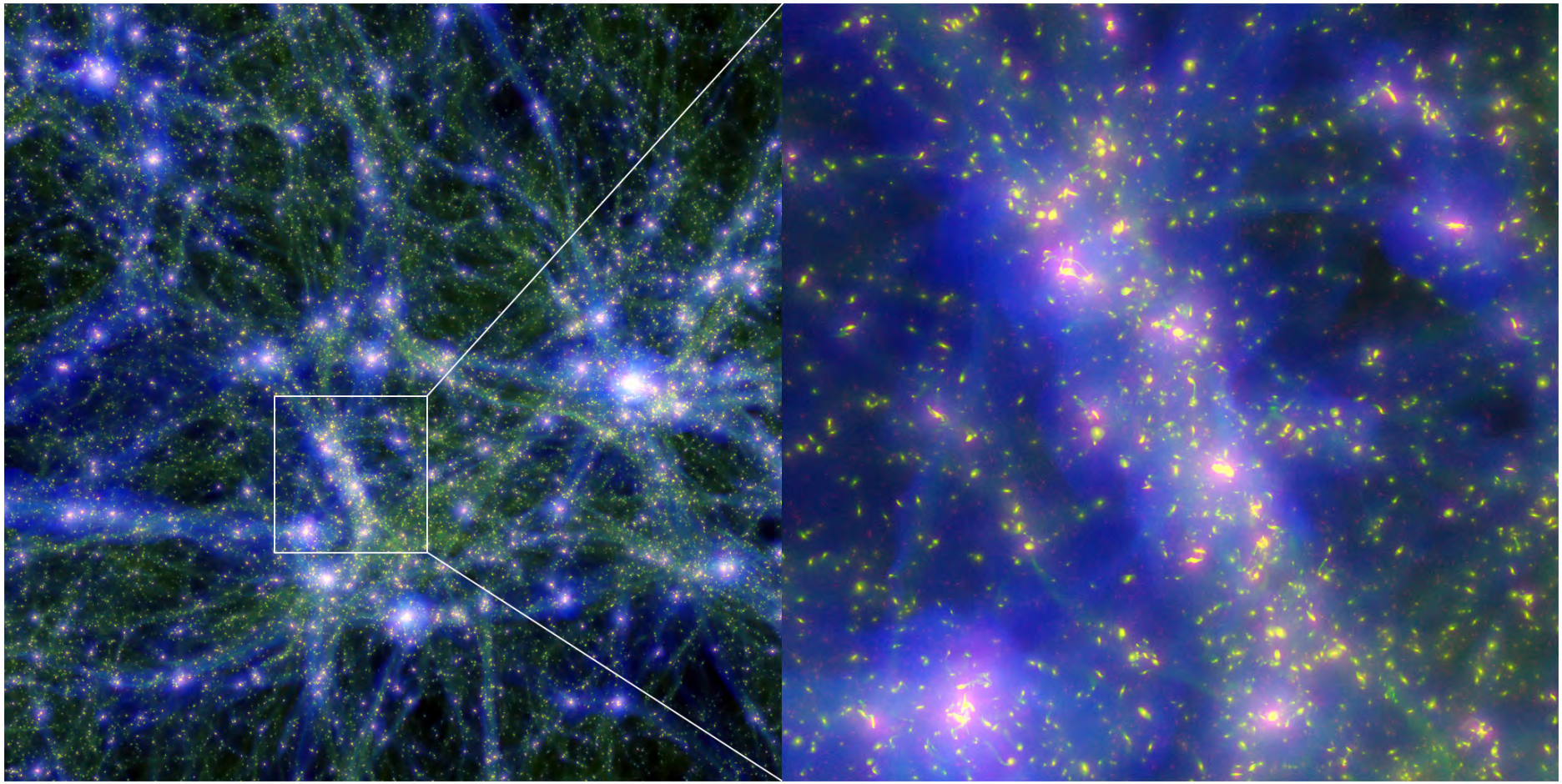


How orientation impacts Lyα properties



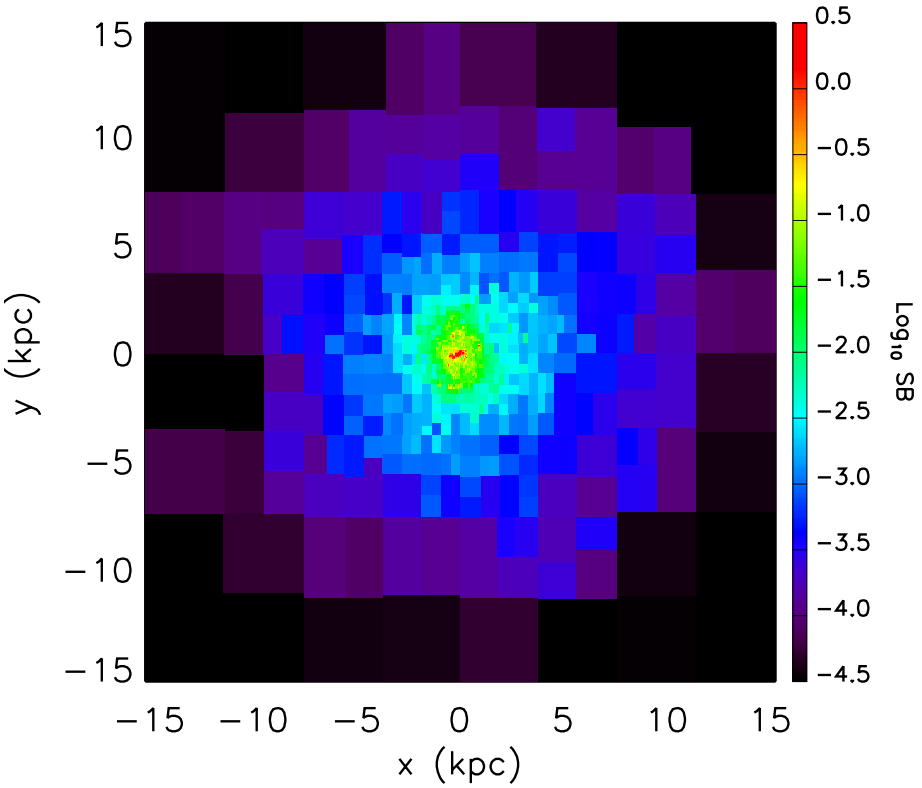
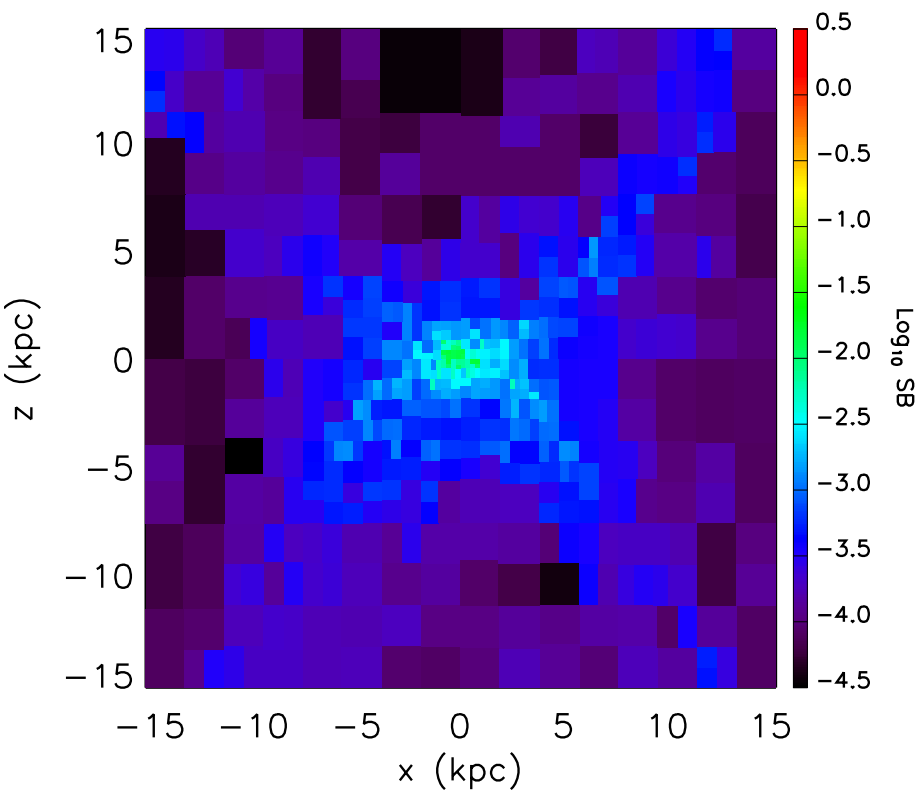


Conclusions



Conclusions

G2 face-on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