funtions computed in collisional ionization equilibrium (CIE) by Sutherland & Dopita (1993) for solar abundances.

Depending on the kinetic energy of the gas injected by the young stellar objects one has two possible outcomes: if the kinetic energy is larger than the gravitational potential of the galaxy, the material is not bounded and will integrate with the IGM; otherwise, the gas is bound to the galaxy and it will return to reintegrate with the ISM. If the material from the SSCs returns and reincorporates to the galaxy ISM two things can happen: it can fall back close to the galactic centre or far from it. Considering that the GW are ejected more or less confined into a cone, material that does not reach a high altitude will fall close to the galactic centre, while gas that reaches a high altitude can fall back at large galactocentric radii.

In order to quantify the mass loss in numerical models one has to determine which material will be considered lost to the IGM. Here, we calculate the mass ejection efficiency as as the ratio of the mass ejected (unbound) to the total gas mass,

$$\xi_m \equiv \frac{M_{\rm ej}}{M_g}. \quad (1)$$

One can also define a "metal ejection efficiency" as

$$\xi_z \equiv \frac{M_{c,\rm ej}}{M_c}, \quad (2)$$

where M_c is the total mass injected by the SSCs, and $M_{c,\rm ej}$ the mass, also originated in the SSCs that is unbound.

3. NUMERICAL SIMULATIONS

We have performed radiative 3D N-Body/SPH simulations that model the effect of a central compact starburst, in which mechanical energy is injected by stellar cluster winds, using GADGET-2. All simulations were done with 3 types of particles: disk, halo, and gas particles, and, unless otherwise stated, each consist of 30000, 40000, and 30000 particles, respectively.

3.1. *The host galaxies and the starburst regions*

We constructed ten isolated galaxies as described in Springel (2005) and in Rodríguez-González et al. (2011). The galaxies are named from G1 to G10, they have ISM masses in the range of $\sim 5\times10^6 - 10^{10}\ M_\odot$, with the total masses are in the $\sim 4\times10^8 - 1\times10^{12}\ M_\odot$ range. The disk masses of the galaxies are given by $M_d = 0.041\ M_{\rm tot}$, and the total mass of the gas is of 35% of the galactic visible mass in all of the models. On the other hand, we assumed that all of the energy produced in the SB lifetime is injected instantaneously, at a given time t_c, inside a spherical region of radius $R_c = 200$ pc at the center of the disk galaxy as thermal energy.

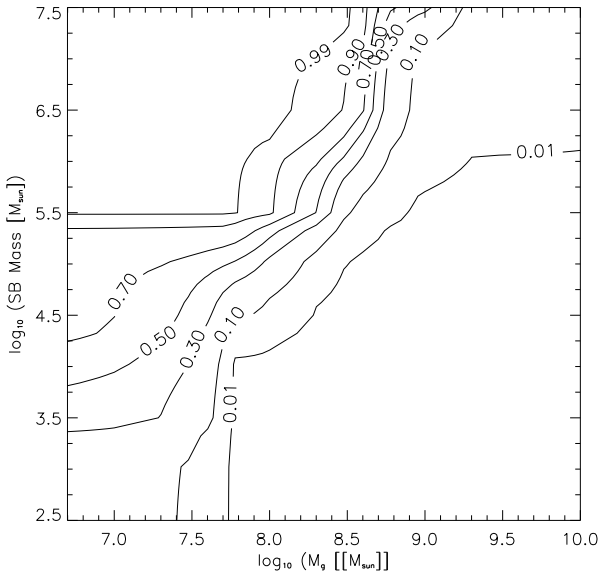

Fig. 1. Mass ejection efficiency (equation 1) countours as a function of total mass of the gas and total starburst masses.

Our results of mass ejection efficiencies is presented in Figure 1. In Rodríguez-González et al. (2011) we present a mass and metal ejection efficiencies for adiabatic and radiative cases, in the same range of ISM galaxy and starburst masses.

4. CONCLUSION

We show that for compact starburst regions (e.g. inside the SSC) with masses larger than $2\times10^6\ M_\odot$ in the adiabatic case, the metal injected by the nuclear starburst is expelled to the IGM (at least 90% of this gas). We show that in galaxies with gas masses between 10^7 to $10^{10}\ M_\odot$ and with a massive nuclear starbursts the available metals are freed from the gravitational potential of the galaxy.

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