Long ago, Lynds & Sandage (1963) found a large outflow in M82 and gave the first definition of a starburst (SB). They proposed that material was ejected from the nuclear regions as a consequence of a series of SN explosions. Since then, galaxies with concentrated central starbursts (M82, NGC 253, NGC 1569, to name a few) have been used to study the GW phenomenon.

Tenorio-Tagle & Muñoz-Tuñón (1998) showed the importance of the galactic potential component due to the cold dark matter halo in realistic models of GW, and concluded that the fate of the stellar wind and SNe material depends on the galactic properties and on the total energy injected by the SB. They showed that dwarf galaxies with an interstellar medium (ISM) with masses of the order of 10^9 $M_\odot$, retain their metals unless they undergo an extreme burst of star formation, much larger than those presently observed. On the other hand, MacLow & Ferrara (1999) explored both, analytically and numerically, the effects of stellar winds and SN explosions, in SBs with mechanical luminosities in the $\sim 10^{37}-10^{39}$ erg s^{-1} range on the ISM of dwarf galaxies with gas masses in the $\sim 10^6$ to 10^9 $M_\odot$ range. They distinguished between two possibilities of gas ejection: (a) A "blowout", which requires material be accelerated above the escape speed at a distance of about three times the scale height. (b) A "blow-away", in which virtually all the ISM is accelerated and lost to the galaxy. The blowout would happen preferably for flatter galaxies; rounder galaxies are more likely to be completely disrupted (blow-away) if enough energy is injected. Their conclusion was that dwarf galaxies in that mass range undergo blowout for moderate-to-high luminosity starbursts values ($L \sim 10^{38} - 10^{39}$ erg s^{-1}), whereas for galaxies with gas masses $M_g > 10^8$ $M_\odot$ and mechanical luminosity $L \sim 10^{37}$ erg s^{-1} the blowout was inhibited. They also found that in the lowest mass objects, blow-away occurs virtually independently of L.

Many authors have shown that in the nearest starburst galaxies GWs could form through the collective effect of many individual stellar cluster winds, which in turn are formed by the collective effect of many individual stellar winds. Perhaps the best studied starburst galaxy is M82, which has an extended, biconical filamentary structure in the optical (Shopbell & Bland-Hawthorn 1998; Ohyama et al. 2002). In M82, the super stellar clusters (SSCs) have Hα luminosities in the $(0.01-23)\times 10^{38}$ erg s^{-1} range (Melo et al. 2005). These authors compiled a catalog of 197 SSCs in M82 and 48 SSCs in NGC 253 (Melo 2005), with masses in the $10^4 < M/M_\odot < 10^6$ range (more recently, additional young star clusters in M82 have been reported by Smith et al. 2007 and Westmoquette et al. 2007). Other examples are NGC 1569 (Anders et al. 2004; Westmoquette, Smith, & Gallagher 2008) and M83 (Harris et al. 2001), with SSCs densities and masses similar to those of M82. Such an exceptional density of massive clusters (i.e. $\sim$620 kpc^{-2}, see also Anders et al. 2004; Melo et al. 2005; Melo 2005) is the best scenario to study powerful GWs driven by SSC winds originated in nuclear starburst regions.

Yet another interesting effect is when the material ejected from the SSCs winds does not abandon the galaxy. Tenorio-Tagle (1996) explored the effect of a non-uniform interstellar medium (density and temperature) in the cooling efficiencies within the giant cavities. In high density regions the cooling would be more effective and would produce a series of metal-rich cloudlets. Such cloudlets would fall back to the disk and produce local enhancements of metallicity. However, Recchi, Matteucci, & D'Ercole (2001) and Recchi et al. (2008) presented arguments against this scenario, pointing out that thermal conduction and hydrodynamical drag are likely to disrupt the condensations before they reach the disk, and thus the metals would be spread more or less uniformly throughout the galaxy.

In the present paper we study the effects of young stellar clusters in the nuclear starburst (SB) region on the ISM of dwarf disk-galaxies. In particular, we calculate the amount of enhanced metallicity material that will end up in the intergalactic medium (IGM) and/or in the outer regions of the galactic disk. The paper is organized as follows: in § 2 we describe the ingredients of the galactic models that we use. In § 3 we discuss the possible fate of the mass and metals in such galaxies. In § 4 we describe a series of 3D simulations of the interaction of SSCs with the galactic ISM. The results are presented in § 5, and our conclusions in § 6.

2. GALACTIC MODEL INGREDIENTS

Each galaxy in our study consists of a dark matter halo, and a rotationally supported disk of gas and stars. The models are constructed following the approach described in Springel, Di Matteo, & Hernquist (2005, see also Hernquist 1993 and Springel 2000). A near-equilibrium galaxy model is constructed, with a dark matter halo that follows a Hernquist (1990) profile, and a disk with exponential surface gas density. Then, using an iterative procedure, the vertical gas profile is determined self-