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NEUTRAL HYDROGEN OBSERVATIONS OF THE EXTREMELY METAL–POOR BLUE COMPACT DWARF GALAXY SBS 0335–052

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We present VLA H I observations of one of the most metal–deficient blue compact dwarf (BCD) galaxies known, SBS 0335–052, which sports an oxygen abundance of only $1/40^{\rm th}$ that of the Sun. We study the structure and dynamics of the neutral gas in this chemically young object at a spatial resolution of $20'' \times 15''$ (5.4×3.9 kpc at a distance of 54 Mpc), and a velocity resolution of 21.2 km s^{-1}.

We detected a large H I complex associated with this object with an overall size of about 64×21 kpc and elongated in the East–West direction (see Fig. 1). There are two prominent, slightly resolved peaks visible which are separated by 22 kpc ($84''$). The eastern peak is nearly coincident with the position of the optical galaxy SBS 0335–052. The western peak is about a factor of 1.3 brighter in the H I line and is identified with a faint blue compact galaxy, SBS 0335–052W, which has an $m_V = 19$, and a metallicity close to the lowest values known for BCDs, about $1/50^{\rm th}$ that of the Sun. The radial velocities of both systems are similar, suggesting that the two BCDs form a pair of dwarf galaxies embedded in a common H I envelope. Alternatively, the BCDs could be the nuclei of two distinct interacting primordial H I clouds. The estimated total dynamical mass, assuming the BCDs form a bound system, is larger than $7 \times 10^9 M_\odot$. This is to be compared to a total gaseous mass $M_{\rm gas} = 2.0 \times 10^9 M_\odot$, and a total stellar mass $M_{\rm star} < 10^8 M_\odot$. Hence, the mass of the SBS 0335–052 system is dominated by dark matter. Because of the disturbed H I velocity field and the presence of what might be tidal tails at either end of the system, we favor the hypothesis that the star formation triggered in this system was provided by a tidal interaction, either with the nearby giant galaxy NGC 1376 or as a result of the mutual gravitational interaction of the two H I clouds proper.

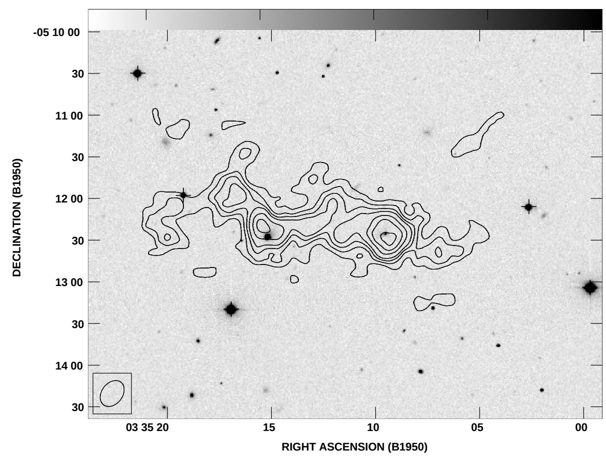

Fig. 1. Overlay of the H I contours on top of an optical B–band image from Papaderos et al. (1998). The H I contours are drawn at levels of 0.75 (2σ), 1.8, 2.7, 3.6, 5.4, 7.2, and 9.0 $\times 10^{20}$ cm^{-2}

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REFERENCES

Papaderos, P., Izotov, Y. I., Fricke, K. J., Guseva, N. G., & Thuan, T. X. 1998, A&A, 338, 43

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