IS OH ABUNDANCE ENHANCED IN TIDALLY DISTORTED GALAXIES?

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An extensive survey of 240 galaxies for hydroxyl absorption has been completed using the Arecibo Observatory; the results can be found in Schmelz et al. (1986). These galaxies along with those observed by Rickard, Bania, and Turner (1982), and Baan et al. (1985) were used to compile a sample to test for statistical correlations between the optical depth of the 1667 MHz hydroxyl line and various parameters of the parent galaxy. To be included in the sample, the radio flux density of the galaxy at 1667 MHz had to be between 20 mJy and 1000 mJy and the galactic declination between 0^{o} and 38^{o}. Since this sample contains mainly non-detections, statistical methods for astronomical data with upper limits as described by Isobe, Feigelson, and Nelson (1986) were used to obtain correlation and regression information.

Preliminary studies indicate a strong correlation between OH optical depth and infrared to blue luminosity ratio (L_{IR}/L_{B}), where the infrared data were obtained from the Cataloged Galaxies and Quasars Observed in the IRAS Survey (Lonsdale et al. 1985). A second correlation is seen between the optical depth of the 1667 MHz line and galactic type, where a number from 1 to 15 (Elliptical to peculiar, distorted, or interacting) has been assigned to each galaxy. So, stable, isolated galaxies tend not to have detectable hydroxyl. On the other hand, galaxies with more gas and dust, galaxies with a more peculiar or distorted appearance, and galaxies which are more tidally interacting tend to have much more detectable OH.

These findings could indicate that these dusty, peculiar, distorted, and interacting galaxies could be the site of large amounts of shocked material where OH is likely to form. Hence, the hydroxyl abundance could be enhanced in these regions of shocked material making the detection of OH in these tidally distorted galaxies much more likely.

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