

## 0.8mm extragalactic surveys of nearby galaxies.

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**Abstract.** We present the first submillimetric line survey of extragalactic sources carried out by APEX. The surveys cover the 0.8 mm atmospheric window from 270 to 370GHz toward NGC253, NGC4945 and Arp220. We found in NGC 253, 150 transitions of 26 molecules. For NGC 4945, 136 transitions of 24 molecules, and 64 transitions of 17 molecules for Arp 220. Column densities and rotation temperatures have been determinate using the Local Thermodynamical Equilibrium(LTE) line profile simulation and fitting in the MADCUBA IJ software. The differences found in ratios between the Galactic Center and the starburst galaxies NGC 4945 and NGC 253 suggest that the gas is less processed in the latter than in the Galactic Center. The high 18O/17O ratios in the galaxies NGC 4945 and NGC 253 suggest also material less processed in the nuclei of these galaxies than in the Galactic Center. This is consistent with the claim that 17O is a more representative primary product than 18O in stellar nucleosynthesis (Wilson and Rood 1994); Also, we did a Multitransitions study of H3O+ at 307GHz, 364GHz, 388GHz and 396GHz. From our non-LTE analysis of H3O+ in NGC253 with RADEX we found that the collisional excitation can not explain the observed intensity of the ortho 396 GHz line. Excitation by radiation from the dust in the Far-IR can roughly explain the observations if the H2 densities are relatively low. From the derived H3O+ column densities we conclude that the chemistry of this molecule is dominated by ionization produce by the starburst in NGC253 (UV radiation from the O stars) and Arp 220 (cosmic rays from the supernovae) and likely from the AGN in NGC4549 (X-rays ); Finally, we report, for the first time, the tentative detection of the molecular ion HCNH+ (precursor of HCN and HNC) toward a galaxy, NGC4945, abundance explain the claimed enhancement of HCN abundance in the AGN, due to the enhancement of the ionization rate by X-rays. The abundance is much larger than the Galactic center of the Milky Way.

**Keywords.** submillimetric, NGC253, NGC4945, Arp220, H3O+, HCNH+