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## Dense gas in nearby galaxies

### XVII. The distribution of ammonia in NGC 253, Maffei 2, and IC 342\*

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#### Abstract

*Context.* The central few 100 pc of galaxies often contain large amounts of molecular gas. The chemical and physical properties of these extragalactic star formation regions differ from those in galactic disks, but are poorly constrained.

*Aims.* This study aims to develop a better knowledge of the spatial distribution and kinetic temperature of the dense neutral gas associated with the nuclear regions of three prototypical spiral galaxies, NGC 253, IC 342, and Maffei 2.

*Methods.* VLA CnD and D configuration measurements have been made of three ammonia (NH<sub>3</sub>) inversion transitions.

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*Results.* The  $(J,K) = (1, 1)$  and  $(2, 2)$  transitions of  $\text{NH}_3$  were imaged toward IC342 and Maffei2. The  $(3, 3)$  transition was imaged toward NGC253. The entire flux obtained from single-antenna measurements is recovered for all three galaxies observed. Derived lower limits to the kinetic temperatures determined for the giant molecular clouds in the centers of these galaxies are between 25 and 50K. There is good agreement between the distributions of  $\text{NH}_3$  and other  $\text{H}_2$  tracers, such as rare CO isotopologues or HCN, suggesting that  $\text{NH}_3$  is representative of the distribution of dense gas. The “Western Peak” in IC342 is seen in the  $(6, 6)$  line but not in lower transitions, suggesting maser emission in the  $(6, 6)$  transition.

**Key words:** galaxies: ISM / galaxies: abundances / galaxies: starburst / radio lines: galaxies / galaxies: general

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\* Appendix A is available in electronic form at <http://www.aanda.org>

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