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Schraml J & Mezger P G. Galactic H II regions. IV. 1.95-cm observations with high angular resolution and high positional accuracy. *Astrophysical J.* 156:269-301, 1969.
[National Radio Astronomy Observatory, Charlottesville, VA]

From observations of H II regions at 1.95-cm wavelength, we derived, for the first time, densities up to $10^5/cm^3$, which most probably represented remnants of recently formed O-stars. These compact H II regions are closely related spatially to nonthermal OH-emission spots. [The *SCI*® indicates that this paper has been cited in over 345 publications.]

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Most of the interstellar matter in a galaxy consists of neutral hydrogen. Embedded in the neutral hydrogen, regions of ionized gas, the H II regions, are found in the vicinity of hot stars. These H II regions can be well observed with radio telescopes at cm wavelengths. Especially after the detection of spectral lines in the radio wavelength range—the nonthermal maser lines of the OH radical and the recombination lines of hydrogen and helium—H II regions were reinvestigated observationally as well as theoretically.

My time as a research associate at the National Radio Astronomy Observatory started on the dedication day of the 140-foot radio telescope. This telescope was just the instrument for Peter G. Mezger and me to observe the more intense H II regions in the radio continuum at 1.95-cm wavelength with an angular resolution of 2 min of arc. The observations were interleaved with careful investigations of the properties of the instrument, which were necessary for a reliable calibration of the astronomical results.

In almost all regions, we found small areas with densities that were at least an order of magnitude higher than the commonly adopted values. These led to the definition of a new class, the compact H II regions. Some of the regions were so dense that they were still optically thick at about 10 GHz, and for this reason they had not been seen in earlier observations at lower frequencies.[1]

Dividing the linear dimensions of the compact regions by the velocity of sound, one reaches H II region lifetimes in the order of 10^4 years; thus, compact H II regions must be objects that are young with respect to the evolution of stars.

This finding stimulated considerable interest among astrophysicists. Later, we found a spatial correlation between the OH maser-emitting centers and the compact H II regions,[2] and comparison with optical pictures of the regions showed that the compact H II regions are located in areas of heavy obscuration most probably due to dust.

Shortly afterward, the first molecular lines were found in many of the compact H II regions discussed in this paper. With its accurate positions, the paper served as a finding chart. At the same time, dust was investigated in H II regions by infrared astronomers and again the paper served as a reference. I hope that this is the true explanation for the many citations of the paper and not just the nice overlays in its appendix.

1. Terzian Y. Radio continuum observations of HII regions. (Terzian Y, ed.) *Interstellar ionized hydrogen.* New York: Benjamin, 1968. p. 283-312.
2. Reid M J & Moran J M. Masers. *Annu. Rev. Astron. Astrophys.* 19:231-76, 1981.

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