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New Interstellar Molecule Detected

P. CRANE, ESO

The molecule ^{13}CN has been detected for the first time in the interstellar medium. This isotopic analogue of the better known ^{12}CN molecule was discovered serendipitously in data which had been taken in order to measure the Cosmic Background Radiation temperature using the CN molecule. The European Southern Observatory's 1.4 metre Coudé Feed Telescope and associated Coudé Echelle Spectrograph with the Reticon detector was used for this work. In order to detect very weak features in the spectrum of the star ζ Ophiuchi, high resolution and high signal to noise spectra were obtained. It was subsequently realized that the ^{13}CN line should be visible in these data. A further analysis to search for this line was successful.

Figure 1 shows a plot of a portion of the observed spectrum and indicates the newly discovered line. This new line is the R(0) line of the 0,0 band of the $B^2\Sigma - X^2\Sigma$ electronic system of ^{13}CN, and its equivalent width is 0.179 ± 0.040 mÅ. For comparison the line of the more abundant ^{12}CN molecule has an equivalent width of 7.646 ± 0.091 mÅ.

In order to detect this line with certainty, observations from seven nights were combined to provide the final results. The line was present at about the 2 sigma significance level in the data from each night but the true significance of the detection was only evident after combining the data from several nights. The total integration time on the star was in excess of 25 hours.

The newly detected feature of ^{13}CN allows a determination of the carbon isotope ratio in the interstellar cloud in the direction of ζ Oph. The ^{12}C/^{13}C ratio determined from these measurements is 50 (+13; −10). This can be compared to

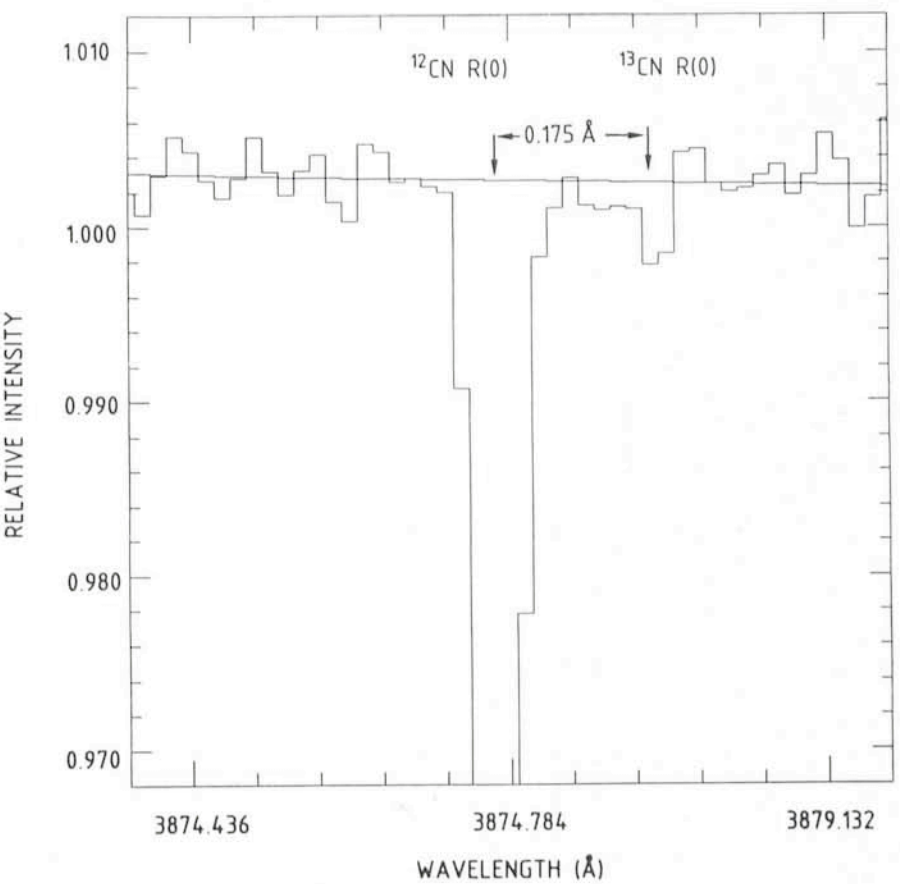

Figure 1: *Plot of the spectrum of the CN R(0) lines near 3875 Å. The upper panel shows range of intensities. The lower panel shows an expanded vertical scale and indicates the weak ^{13}CN feature.*

the terrestrial ratio of 89 and further substantiates theories of the enrichment of ^{13}C in the interstellar medium through evolution of the galaxy since the formation of the solar system. This value also agrees with other recent determinations of the $^{12}C/^{13}C$ ratio from the molecules $^{12}CH^+/^{13}CH^+$ and $^{12}CO/^{13}CO$. Since it had been speculated that ^{13}C might preferentially form CO compared to ^{12}C, the agreement between the CO, CN, and CH^+ abundances indicates that this effect is not very important.

The detection and measurement of weak features requiring high precision and high spectral resolution such as those reported here are a typical example of the way in which the new generation of very large telescopes which should become available early in the next decade can be exploited.

The Work of the ESO Observing Programmes Committee

M.C.E. HUBER, Institut für Astronomie, ETH Zürich, Chairman of the OPC
J. BREYSACHER, ESO

ESO astronomers devote considerable time to preparing, and put obvious care into writing Applications for Observing Time at La Silla. Many take justifiable pride in the presentation of their ideas. Yet, given the heavy oversubscription of telescope time, inevitably a selection of the proposed observing programmes must be made. And often this selection is drastic: in each Observing Period, the applied-for number of observing nights for the various telescopes exceeds the number of available nights by factors of two, at telescopes of intermediate size, to four, at the 2.2-m and 3.6-m telescopes!

It is the task of the Observing Programmes Committee (OPC) to evaluate the scientific merit of the submitted Applications. Based on the OPC's recommendations, ESO then prepares an Observing Schedule – employing the available telescope nights for the best-rated proposals. In the following we will describe the refereeing system of the OPC and explain the steps that lead to the final Observing Schedule on the ESO telescopes.

The history and procedures of the OPC have already been described by the previous OPC chairman, B. Westerlund, in 1982 (Messenger No. 28). In the meantime, the working procedures of the Committee have evolved considerably, so that an updated description is warranted.

The OPC in its current form exists since 1971: there is one Member and one Substitute member from each of the eight ESO countries*, they are designated by the National ESO Committees and serve for five-year terms.

Refereeing the Applications

The eight OPC Members, together with one ESO staff member (usually the Head of the Scientific Group, J. Danziger) referee the 300 to 350 Applications for Observing Time that are currently submitted for every six-month Observing Period (cf. Fig. 1).

Each Application is evaluated by three referees. As a result, each OPC Member has to read and rate over 100 Applications twice a year: he must decide on a mark for each proposed programme and recommend the number of nights that – in his judgement – should be made available to the applicant(s), if the programme actually receives telescope time. The rating scale comprises nine grades (extending from "outstanding" to "useless") that are expressed by numbers 1 to 5 with half-integer steps.

Rating over one hundred individual Applications is not only a demanding, but also a very time-consuming undertaking. This is the reason why so much emphasis is put on concise Applications! OPC Members spend more than the equivalent of one working week in fulfilling this task. A new Member (or a Substitute Member replacing the regular Member) may find that up to two weeks full-time are needed to arrive at a consistent judgement of all the Applications he has to referee. Furthermore, the handling of Applications – from receipt by ESO until the moment when applicants are informed on whether observing time for their proposal(s) can be granted or not – follows a rather tight schedule, giving the OPC Members only about three weeks to evaluate the proposals.

In order to avoid any bias in judgement, some of the referees assigned to a given applicant (or group of appli-

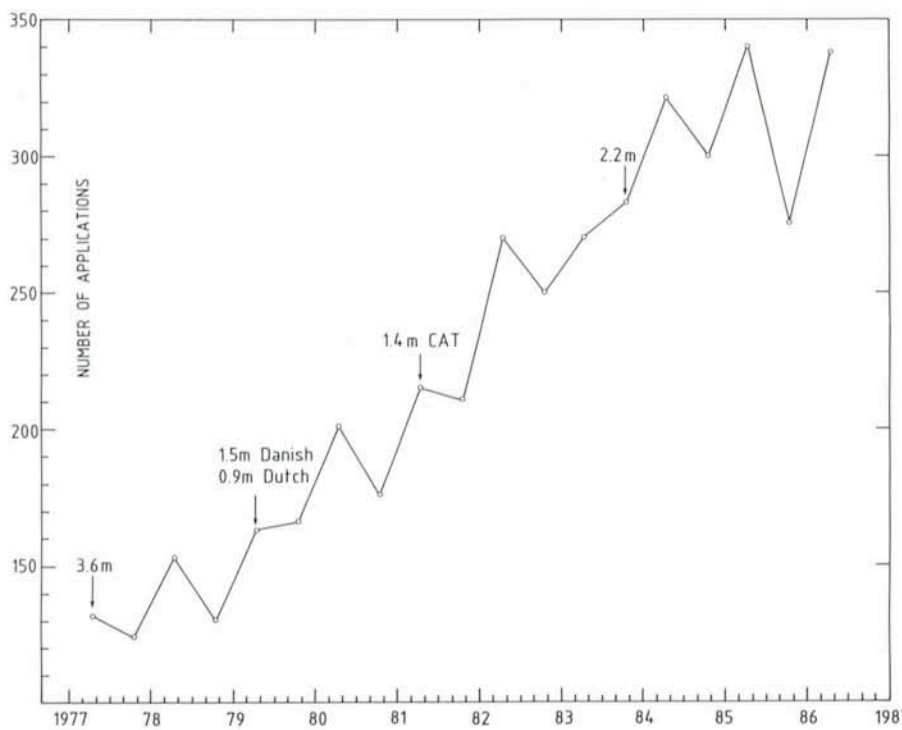

Figure 1: *Number of Applications submitted to ESO during the past nine years. Arrows indicate when new telescopes became available.*

* This year's composition of the OPC is (with Substitute Members in parentheses): J.-M. Vreux (and E.L. van Dessel), Belgium; E.H. Olsen (and P.E. Nissen), Denmark; G. Monnet (and J. Boulesteix), France; K. Fricke (and I. Appenzeller), Federal Republic of Germany; A. Renzini (and F. Bertola), Italy; P.C. van der Kruit (and K.A. van der Hucht), The Netherlands; G. Lynga (and L. Nordh), Sweden; and M.C.E. Huber (and B. Hauck), Switzerland. The OPC Members (and their terms) are listed regularly in the ESO Annual Report.