14. DONNÉES SPECTROSCOPIQUES FONDAMENTALES (FUNDAMENTAL SPECTROSCOPIC DATA)

PRESIDENT: M. Migeotte.
VICE-PRESIDENT: A. H. Cook.
ORGANIZING COMMITTEE: R. H. Garstang, G. Herzberg, W. Lochte-Holtgreven, Mrs Ch. Moore-Sitterly, J. G. Phillips, R. Tousey.

REPORTS

Mrs Ch. Moore-Sitterly has represented the IAU at the Fourth Annual Meeting of CODATA (June 26–27, 1969, Rome, Italy). She also agreed to represent the IAU at the Second International CODATA Conference to be held at St. Andrews (Scotland) from 7 to 11 September 1970 and at the Fifth Annual Meeting of CODATA which follows on September 11–12, 1970.

COMMITTEE 1: STANDARDS OF WAVELENGTH

The primary standard

Experiments on Lamb-dip stabilization of the 6328 Å He-Ne laser line made at NBS, NPL and PTB and reported in a joint paper (**10**) show that the wavelength from different lasers may differ by as much as one part in 10^7. Similar work on a CO_2 laser line at 10·6 μm and a xenon line at 3·5 μm is reported from NPL, the 1·15 μm line in a pure Ne 20 laser has been investigated at JILA (**5**), and several lines in a xenon ion laser are being studied at PTB. However, the method that holds the greatest promise of accuracy and stability is the use of saturated absorption to lock a laser wavelength to some molecular transition having a sharply defined and stable wavelength. Thus the 6328 Å He-Ne laser line can be fixed on a line in the molecule $^{127}I_2$ (**6**, **7**), and the 3·3913 μm line of a He-Ne laser has been connected to a line of CH_4, promising a unique precision and stability according to experiments made at JILA (**5**) and NRC. This technique will evidently yield excellent substitutes for the Kr 86 line, and may, when the time is ripe, lead to the adoption of an improved primary standard.

The wavelength of the primary standard line as emitted by an electrodeless microwave-excited Kr 86 lamp at room temperature (cf. report from the 1967 meeting) has been measured at BIPM (**11**), NPL (**14**) and NRC. The results are somewhat discordant, probably owing partly to differences in the power supplied to the discharge, giving values for the red-shift from 0·0001 to 0·0003 Å. For a provisional value, accurate enough for most applications, we may adopt $\Delta\lambda = +0{\cdot}0002 \pm 0{\cdot}0001$ Å. The Doppler width is as expected about twice that in the standard lamp (**14**). When part of the electrodeless lamp is cooled to 63 K, as in the work by Kaufman and Humphreys (**8**), it was found at NRC that the line broadening is very slight and the red-shift is 0·0001 Å. This shift is equal in magnitude and of opposite sign to the Doppler shift in the standard lamp, showing that the effects of pressure and current density are the same in the two lamps.

Secondary standards

Krypton 86: From the averages of all available precision measurements of 233 lines in ^{86}KrI, Kaufman and Humphreys (**8**) have made a least-squares derivation of 45 even and 66 odd levels. From these level values they have then calculated and tabulated the wavelengths of 530 lines from