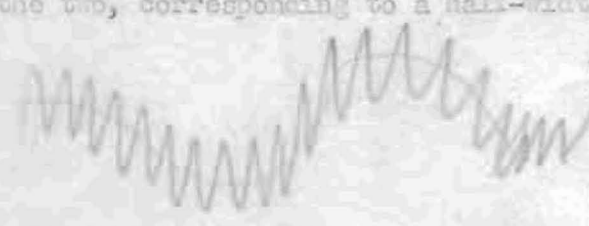


## DISCOVERY OF 1420 MC/S GALACTIC LINE

Even, of the Harvard Physics Dept., has now begun observations with his improved equipment, and has obtained very good evidence for the existence of the 1420 Mc/s line in galactic radiation.

His aerial is directed due south, at declination  $-5$ , the system being fixed in this direction. On the early morning of March 29, the first positive results were obtained, as follows: The line was not visible at 1 a.m., but began to appear soon after and was most clearly evident at around 3.30 a.m. (R.A. approx. 16 h.). An hour later it was slightly weaker and somewhat wider. Thus, in this single observation, it was stronger in the constellation Ophiuchus than in the galactic plane 10-20 degrees away. (Note- aerial bandwidth 2 degrees between half-power points.)

In Even's system, the observation is made by a comparison between two frequencies 50 kc/s apart, so that responses (of opposite sign) are obtained when each of the frequencies is swept through 1420 Mc/s. The pattern obtained was somewhat as shown, with a slight overlapping of the two, corresponding to a half-width of about 50 kc/s.



The line appears in emission, with an intensity corresponding to an aerial temperature of about twice the 15 degree fluctuations. (Noise factor 10 $\frac{1}{2}$ -11 db., I.F. bandwidth 16 kc/s, time constant  $\frac{1}{4}$  seconds.)

The estimated temperature of the background radiation at this frequency is 9 deg., for the centre of the galaxy, and 5 deg. for the region concerned.

To test the reality of the line, Even repeated the observation (i) with the frequency sweep in the opposite direction, and (ii) with the local oscillator frequency moved to a new position 200kc/s away. However, Professor Purcell, who is in charge of the work, still considers that it would be very desirable to have an independent confirmation before publication. In the meantime Even will of course extend his own observations, but he has no present intention of going on to work with a more directive or scanning aerial.

Harvard College Observatory  
April 5, 1951

Dear Ernie,

I thought you might be interested in a copy of the above interesting and rather surprising piece of news. Hope you can read it! The typewriter ribbon was rather poor!

A copy of the above was sent to Pawsey and <sup>to</sup> van der Hulst's people in Leiden, in view of Purcell's interest in confirmation, as both groups have equipment available which could probably be easily modified for the purpose.

I'm sorry I won't be seeing you when I go down for the VRS 1 meeting. I ~~am~~ am not yet certain whether I'll be down again for the AAS meeting, but very likely will be.

Best regards,

Frank Kerr