the luminosity variations[15] observed in quasi-stellar radio sources.

It is perhaps worth noting the obvious fact that the process discussed herein cannot show up in the present-day computing machine calculations[5-7] because all quantities are only radial-dependent in such calculations (spherical symmetry).

The mechanism suggests that mass loss should be greater for shells that end earlier (due to higher temperature dependence). Hence the CN cycle stars should have greater mass loss than stars on the *p-p* cycle. Whether the astronomical evidence supports such a prediction is not as yet known.

This work was supported by a grant from the National Aeronautics and Space Administration. I thank the Observatoire de Paris, Meudon, and the Department of Mathematics, Imperial College of Science and Technology, for their hospitality.

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A Possible Identification of the X-ray Source *Sco X*-3

THE purpose of this communication is to point out the positional coincidence of the X-ray source *Sco X*-3 with an extended H II emission region which may be the remnant of a supernova explosion. Originally, a correlation between supernova remnants and X-ray sources had been predicted by theory and has been verified for the Crab Nebula[1] and for Kepler's supernova *SN* 1604 (ref. 1), although the latter identification has become very doubtful[2].

The position of *Sco X*-3 is given as:

R.A. (1950)	Decl. (1950)
17h 23m	$-44.3°$

This position falls just within the upper opening of the U-shaped H II region No. 114 from Rodgers *et al.*[3,4]. This H II region is described by the authors as a faint, ring-like structure of 50 min width and extending over 5·5° × 5.5°.

Although the star density makes it impossible to classify the object in the Hα *Atlas*[4] according to van den Bergh's[5] criteria as belonging to class III, its general appearance fits remarkably well to that of known supernova remnants. Its size is comparable with the nebula around the radio source Vela *X*, to the Cygnus Loop, to *IC* 443, and to *S* 147, and the latter three objects share additionally its more or less ring-like structure.

No radio source has been reported yet in the direction of the H II region No. 114. However, Hayakawa *et al.*[6] have shown that the active time of radio emission of a supernova remnant may be as short as $\sim 10^3$ years, whereas the X-ray activity may last as long as $\sim 4 \times 10^4$ years. The lack of a detected radio source does not, therefore, bear much evidence against the proposed identification.

It may be noteworthy that the Muslim astrologer, Albumazar, observed in about A.D. 827 a reliably recorded supernova[7] in the tail of Scorpio. It became as bright as the Moon at quadrature ($\sim 10^m$) and was observed for 4 months. If this occurrence should be connected with the H II region No. 114, its present size would have to be explained by expansion during the past 1,140 years. If an absolute brightness of -16^m is assumed for the supernova at maximum, this places it at a distance of ~ 150 parsec; from this follows a very high expansion velocity of 13,000 km/sec. That rather unlikely value cannot be completely ruled out because of the uncertainties involved in our distance estimation and because expansion velocities of at least 7,000 km/sec are observed in supernovae of type II (ref. 8). An observational check could readily be made, because the annual apparent expansion rate of the H II region would have to be 17 sec/year.

I thank Dr. A. R. Sandage and Dr. Maarten Schmidt for their advice.

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PHYSICS

Detection of Weak Microwave Modulation of Light

WE have devised a method of detecting very low levels of modulation on a laser beam, with the object of assessing the performance of microwave light modulators. The system may either be used simply to indicate the presence of modulation, or, in conjunction with a Fabry–Perot interferometer, to demonstrate the existence of optical sidebands as discrete frequencies.

Use is made of the well-known fact that, in general, the adjacent sidebands emerge from an optical modulator with a different plane of polarization from that of the carrier wave[1-4]. Thus, if crossed Nicol prisms are placed on either side of the modulator, the carrier will be suppressed and only the sidebands will emerge from the analyser prism. Kaminow[4] has in fact used such an arrangement to detect modulation from a high-power pulsed magnetron by receiving the emergent light on a photomultiplier tube and displaying the resulting output pulses on an oscilloscope.

The present modulator consists of a crystal of potassium dihydrogen phosphate in a rectangular *TE* 011 cavity fed from a 5-W continuous X-band source. The effective length of the crystal is about 1 cm, and a laser beam passing along the optical axis of the crystal is weakly modulated at the microwave frequency. The depth of modulation, estimated from published values of the electro-optic coefficients of potassium dihydrogen phosphate[5], is about 1 per cent, so that the intensity of the sidebands is 10^{-4} times that of the carrier. To display the optical modulation we impose an audio-frequency modulation on the