

POSSIBLE DETECTION OF 33μ SILICATE FEATURE IN COOL STARS

Infrared emission has been observed from various astronomical objects. These have been interpreted as due to thermal re-radiation by dust which is heated by the central source. Then one is interested in knowing the nature and the composition of the dust. A clue to this was obtained when Gillett, Low and Stein (*Ap. J.*, **154**, 677, 1968) observed for the first time an unexpected broad emission feature around 10μ from several stars. If one scans through the measured absorption spectra of a large number of silicates (rocks and minerals), one finds that they have characteristic strong features around 10 and 20μ with a few secondary features superimposed. Therefore Woolf and Ney (*Ap. J. Letters*, **155**, L181, 1969) attributed the observed 10μ feature as due to material of silicate in nature. The secondary features are characteristic of the structure and composition of the particular silicate. Because of the superposition of a variety of possible types, one would expect the secondary peaks to be washed out. As pointed above, silicates have a second strong feature around 20μ . Therefore, if the observed feature at 10μ is due to silicate material, one should also observe the 20μ feature. This was first detected in the star α -Ori by Low and Krishna Swamy (*Nature*, **227**, 1333, 1970). These two features are generally present in many of the astronomical objects. In addition to the 10 and 20μ features, the silicate absorption curves appear to have a third feature around 30μ (Oehler and Günthard, *J. Chem. Phys.*, **51**, 4719, 1969). Therefore, it was suggested (Krishna Swamy, *Nature Physical Science*, **229**, 149, 1971) that the emission feature around 30μ should be looked for in stars where the other two features have already been detected.

Recently Hagen, Simon and Dyck (*Ap. J. Letters*, **201**, L81, 1975) report new infrared observations at 25 and 33μ band passes of several cool stars. They have observed excess infrared radiation around 33μ in several of these stars, which they attribute to a third silicate feature. Therefore, the detection of 33μ emission feature seems to further support the silicate dust hypothesis.

At the present time, the main emphasis in the infrared measurements is to get high resolution observations in this region of the spectrum, with a view to identify some of the absorption bands. With these refined observations, one will be able to get a better idea of the exact nature and the composition of the dust.

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Proceedings of the Seminar on 'Infrared and Millimeter Range Astronomy. Editors S. M. Alladin and K. D. Abhyankar (Osmania University, Hyderabad 500 007), 1974.

A two day seminar on 'Infrared and Millimeter Range Astronomy' was held at the Centre of Advanced Study in Astronomy, Osmania University, Hyderabad on 25th and 26th December 1974. The review papers presented at the seminar have been published under the above title. There were four sessions covering the topics : General, Infrared Telescopes, Infrared Techniques and Millimeter Range Astronomy.

In the first session J. V. Narlikar dealt at length about the importance of infrared and millimeter astronomy in cosmology. He has stressed that observations in this range could help throw new light on the problems relating to whether or not microwave background originated in the big bang, the existence of unseen matter in the universe, etc.

In the session on Infrared telescopes, M. V. K. Apparao has discussed on Far Infrared Telescopes. He has summarized the experiments and some of the results that have been obtained by various workers in this field from balloon and airplane. This is followed by a paper of S. N. Tandon who gives an account of the infrared astronomy program that is being carried out at the Tata Institute of Fundamental Research where they are concentrating in the spectral region between 50 and 450μ . The paper by A. Bhatnagar is about the site survey for an infrared observatory.

In the section on Infrared Techniques, P. V. Kulkarni has given a comprehensive review of infrared detectors. He has touched upon the various physical aspects involved in the infrared detectors and the parameters on which the performance of the detector depends. He has summarized the status of the subject. J. C. Bhattacharya has talked about the ground based near infrared detector systems. He has reviewed the difficulties and limitations with the infrared measurements done from the ground. He concludes with an outline of the system being developed at the Indian Institute of Astrophysics to be used with the 50 cm reflector at Kodaikanal and also with the 1 meter telescope at Kavalur.

In the session on Millimeter Range Astronomy, R. V. Bhonsle reviewed the status of our knowledge of interstellar molecules detected by means of radio spectral line measurements. The importance of the study of interstellar molecules in understanding some of the problems like formation of stars, structure of the Galaxy etc are touched upon. This is followed by the paper of N.V.G. Sarma, who discusses a new design for a millimeter wave radio interferometer consisting of a fixed parabolic toroidal reflector and several passive plane reflectors. With this system it is possible to study accurate position and fine structure of molecular clouds and HII regions.

There were four more papers which were presented at the seminar and these are just given as titles or with their abstracts.

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