

PROBLEMS CONCERNING PLANCK'S BLACKBODY LAW

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For the calibration of radiation detectors, use is currently made of blackbodies, assuming they satisfy Planck's Law. The first problem considered here is then: how well has this law been checked experimentally? Now, it has been pointed out (Crovini and Galgani 1984) that essentially no new experiments have been made after 1921 (Rubens and Michel 1921), when the data were interpreted as fitting the theoretical law within 1%. But, in fact, this work made use of the value 14300 (in suitable units) of the second radiation constant, while the presently adopted value is 14388. When one inserts this value into the calculations, one finds that, indeed, Planck's Law has been checked only to 3%.

Furthermore, some theoretical considerations, based on Arnold's diffusion, lead to the idea that Planck's Law could be just a first approximation to the radiation law, and that one could expect some corrections in the Rayleigh-Jeans region for values of $x=h\nu/kT$ less than 0.2. No experiments on blackbodies are available in that region. Looking, instead, at the data for the Sun, clear deviations are observed, giving a plateau.

REFERENCES

- Crovini, L. and Galgani, L. 1984, Lett. Nuovo Cimento, 39, 10.
Rubens, H. and Michel, G. 1921, Z. für Phys., 22, 569.